NOVEMBER, 1957

Commercial Fertilizer
and PLANT FOOD INDUSTRY

A Method of Solving Granulation Problems

SEE PAGE 19

Advertisement of NITROGEN DIVISION, ALLIED CHEMICAL

QUIZ

For Multiwall Bag Buyers

"How Does Your Packaging Operation Rate?"

1 Is your bag correctly sized for your product?
2 Is your bag properly constructed for your product?
3 If loss of product is caused by deterioration, would special protective sheets help to reduce such loss?
4 Is the total cost of your bag out of proportion to the selling price of your product?
5 Does your product cost warrant redesigning your bag to merchandise your product more effectively?
6 Are you using the most economical filling machine available for packaging?
7 Are your current suppliers giving you the service you desire?
8 Are your suppliers integrated and capable of maintaining dependable service at all times, under all conditions?
9 Are your suppliers' representatives qualified to help you with your packaging, sales promotion and marketing?

Perhaps we may be able to help you to arrive at the right answers in order to achieve higher production at lower costs.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Plants at St. Marys, Ga. and Gilman, Vt.

Sales Agents for The **Kraftpacker** Open Mouth Bag Filling Machine

Gilman PAPER CO.
- St. Marys Kraft Corp.
- Gummed Tape Div.
- The Cellucord Corp.
- Kraft Bag Corp.

☐ O.K. Kraft...Help me to answer your Quiz. Please have representative call. C1

COMPANY_____

ADDRESS_____ ZONE____ STATE_____

CITY_____

PRODUCT MFD._____ NAME_____

..and quality you can *talk* about!

NUTRONITE IS THE QUALITY, NATURAL ORGANIC SUPPLEMENT TO CHEMICAL PLANT FOODS

Nutronite (formerly Smirow) adds to the selling power of your mixed fertilizers. Plainly visible Nutronite assures your customers of added growth and profits . . . brings back satisfied customers year after year.

Nutronite is the 100 percent natural organic addition to mixed fertilizers. Its nitrogen is 90% water insoluble and 90% available—for that all-season effect on plant growth.

Nutrition + Nitrogen = Nutronite

Let us figure the cost of Nutronite delivered to your plant.

SMITH NUTRONITE ROWLAND

SMITH-ROWLAND CO.

P. O. Box 1219, Norfolk 1, Va.

A DIVISION OF SMITH DOUGLASS COMPANY, INCORPORATED

MAKE YOUR OWN SULPHURIC ACID

IN THIS NEW, COMPACT VANADIUM CATALYST CONTACT PROCESS PLANT

Improve your net profit; protect yourself on costs with your own sulphuric acid plant. Designed by Weatherly, you can have a plant that is easy to operate, fully flexible to meet demand—economical to build and to run.

Weatherly will build your plant to suit your need, with 15-minute changeover within the production range you choose. 93% acid, or 98%. Plant sizes from 50 to 550 tons.

Let us discuss it with you. See our down-to-earth, practical, commonsense cost and production facts that show exactly how you make more money when you make your own sulphuric acid.

Remember, Weatherly developed the famed granulation process that bears our name, and also Di-MAP*Process economy plants.

**Formerly DiaPhos*

The D. M. WEATHERLY COMPANY

Industrial Engineers and Builders

80 Eleventh St., N.E., Atlanta, Georgia Phone: TRinity 5-7986

Published Monthly by
WALTER W. BROWN PUBLISHING CO., INC.
75 Third St., N. W., Atlanta 8, Ga.
Phone TRinity 4-4160

Address all inquiries, advertising and editorial material, and correspondence to Atlanta Publishing Offices, sending direct to COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, 75 Third St. N. W., Atlanta 8, Georgia.

President
ERNEST H. ABERNETHY

Editor
CLAY W. PENICK, JR.

Associate Editor
BRUCE MORAN

Business Manager
V. T. CRENSHAW

Chicago Representative
ELON A. ABERNETHY
1753 Howard St.—Room 200
Chicago 26, Illinois
Phone Rogers Park 4-5616

West Coast Representative
M. A. CALDWELL
2267 W. 24th St., Los Angeles, Cal.
Phone REPUBLIC 1-3050

Vol. 95 No. 5 *Established 1910* November, 1957

Commercial Fertilizer
and PLANT FOOD INDUSTRY

Subscription rates: United States, $3.00 per year; 5 years, $12.00. Foreign $5.00 per year.

Contents

Just Around the Corner, by *Vernon Mount* 12
The Non-Farm Fertilizer Market, by *Arnon L. Mehring* 24
Selling Lawns Sells Fertilizer 33
Turf—Under Pressure 34
Low Cost Cotton Production, by *George E. Smith* 36
CFA Expects 600 40
Support 4-H Clubs 40
New Era in Agricultural Aviation by *Kenneth Messenger* 43
Around the Map 44
Restrictions Cut India's Fertilizer 46
Georgia Starts "Operation Fertility" 46
Personals 50
Changes 53
Potash Institute Reports on European Forest Fertilization 54
Fertilizer Control Officials Meeting Report 57
Chemical Control Procedures Conference 60
Fertilizer Solutions Meeting Plans 62
Random Notes & Quotes 64
Pacific Sun Valley Meeting 66
Salesmanship, by *B. R. Bertramson* 66
Research Results & Reports 70
Staff Tonnage Reports & Markets 73
Industry Meetings Calendar 73
NPFI Traffic Committee 76
Classified Advertising 77
Index to Advertisers 78

COMMERCIAL FERTILIZER and PLANT FOOD INDUSTRY, entered as second class matter, October 12, 1910, at the post office at Atlanta, under the Act of March 3, 1879. Published monthly except semi-monthly in September, by Walter W. Brown Publishing Co., Inc., 75 Third St., N. W., Atlanta 8, Georgia.

Commenting Freely

by Bruce Moran

A moral we might, and perhaps should have, drawn from our feature last month "Farms Must Grow Larger" was expressed last month by Vergil Reed, speaking to the NAC, for whom he predicted a fine future "as farming becomes a commercial undertaking rather than a way of living." We have crept up to the edge of this idea, but never stated it so pungently.

For that is really what is happening in agriculture. Instead of what the South calls the "one mule farm" we are rapidly moving to highly mechanized operatings, well financed, well managed—and profitable accordingly. The one mule farm is indeed a way of living, but it is a way to just get by on the essentials of food, shelter and clothing, with little or nothing left over for a nest-egg.

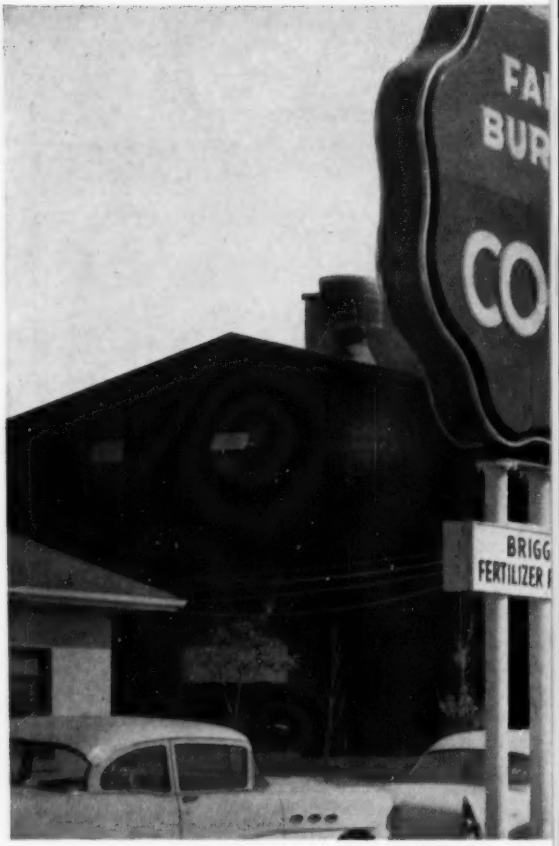
While politicians may rant about the vanishing of the little farmer, he is much better off when he becomes part of the well-ordered mechanism of the commercial operation.

When the truth of that statement is generally accepted, the farm will cease to be a problem, politically, economically, socially.

Our plant managers all agree...

"International's Triple hits a consistent high in product quality and service"

says A. R. Mullin,
General Manager,
Fertilizer Division
Indiana Farm Bureau
Cooperative Association



Activities at the Hartsdale plant are directed by William Henderson (right).

Ralph Middaugh (right) is superintendent of the Jeffersonville plant.

Robert R. Leach (left) supervises operations at the Briggs fertilizer plant.

The Indianapolis plant is managed by Plant Superintendent L. M. Leach.

Our requirements: Dependable service . . . desirable physical characteristics . . . uniformly high ammoniation and granulation results

"Basic goods get a rugged test in our fertilizer plants. And actual performance is the reason we place International's Triple Super right at the top when we figure our requirements," says A. R. Mullin, General Manager of Indiana Farm Bureau's Fertilizer Division.

Reports from the superintendents at the four modern plants (Briggs, Hartsdale, Indianapolis and Jeffersonville) show why.

International's Triple is a consistent, high quality product . . . very good for ammoniation and granulation. It has the desirable physical condition that plant people like to see in the Triple they're using.

"What's more International has proven that they can deliver the goods when we need it," Mullin adds.

And Mullin knows whereof he speaks. He has been with the Indiana organization since 1935 . . . took charge of the Fertilizer and Seed Division in 1944.

You, too, can rely on International's superior quality product and an aggressive, stimulating outlook in service, research and product development. Write or wire for full information.

INTERNATIONAL MINERALS International MINERALS CHEMICALS **& CHEMICAL CORPORATION**

PHOSPHATE CHEMICALS DIVISION .... 20 N. WACKER DRIVE, CHICAGO 6, ILL.

BENCH-SCALE DISTILLATION EQUIPMENT. The Center has various types and sizes of apparatus to distill any size sample from one cc to a tank-car load.

Unique Lummus Engineering Development Center—30 Minutes From Manhattan—Proves Out Processes Before Construction

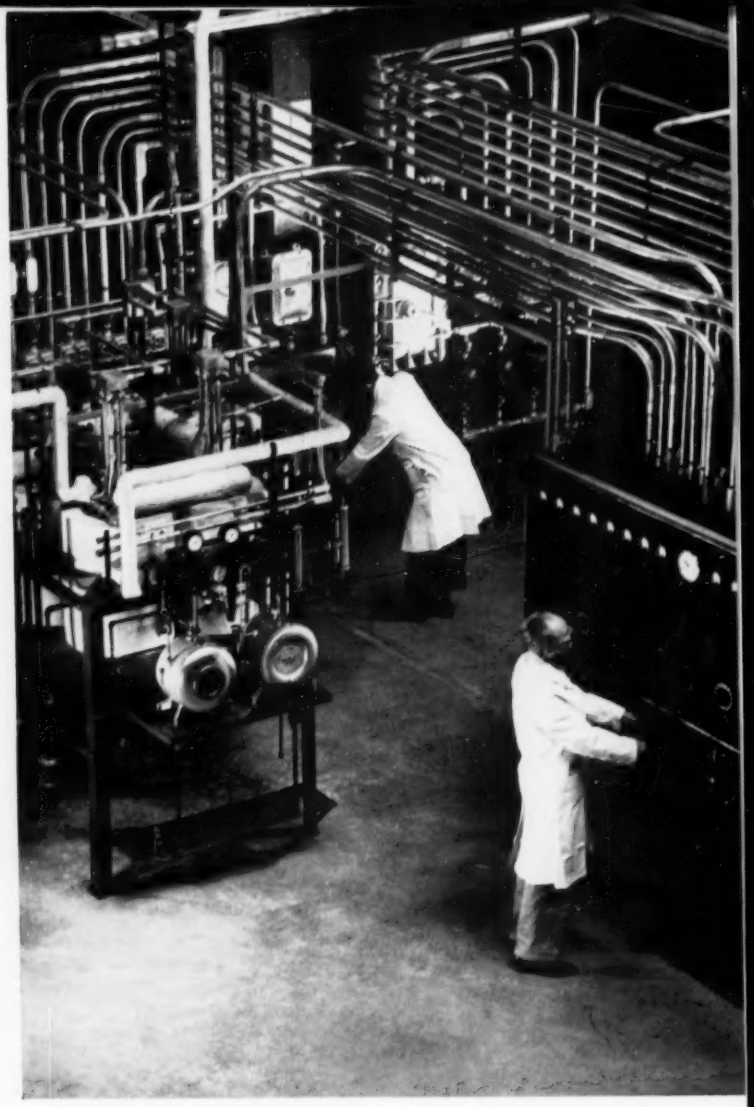
At a new 150,000 square-foot Center near the Newark Airport, the Lummus Company is expanding a long-established engineering development program into a major service to the process industries. The intensive pilot plant investigations carried out here will, in the years to come, spell the difference between rash gamble and sound plant investment for many manufacturers in the chemical, petroleum, pulp and paper and allied fields.

For a complete description of The Center and how it can help you bridge the gap between laboratory research and successful production, write for the 16-page brochure "Lummus Engineering Development Center." Address The Lummus Company, 385 Madison Avenue, New York 17, New York.

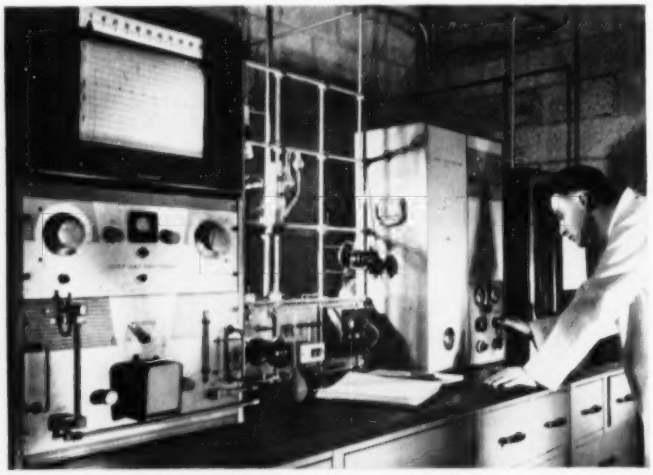
LUMMUS

ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

NEW YORK • HOUSTON • BATON ROUGE • CHICAGO • MONTREAL
CARACAS • LONDON • PARIS • THE HAGUE • BOMBAY



MOST PILOT UNITS at The Center are put together from standard "building blocks." Skid-mounted charging units such as the one at left hold tanks, heaters and pumps for transfer and metering. Process equipment, here shown in background center, can be widely varied. At right is electrical control cabinet. All switches, relays and controls not housed in explosion-proof boxes are enclosed in cabinets like this one, pressurized with outside air to exclude process vapors.



ANALYSIS OF MATERIALS processed and produced in pilot operations at The Center is an important part of the work carried out by Lummus engineers. Here a laboratory technician determines the composition of a multiple-component gas, using a gas chromatography technique.

S·P·M
PREMIUM
Premium quality fertilizer certified through use of a balanced combination of the water-soluble magnesium and potash obtained from
Sul·Po·Mag®
SULPHATE OF POTASH MAGNESIA

Include Sul-Po-Mag in your premium fertilizer—and display the SPM seal. The SPM seal can be displayed on bags and tags, in dealers' and manufacturers' displays, and in newspaper advertising.

Use this seal to increase sales ...before it's

TOO LATE for TOP PROFITS

Your premium fertilizer is *pre-sold* through advertising to *more than a million potential customers* when bags carry the Sul-Po-Mag seal. Your potential customers are presented with the facts: (1) how indications of magnesium deficiency —yellowing between the veins of leaves—mean top profits are lost; (2) how Sul-Po-Mag®, made by International Minerals and Chemical Corporation, can make fast-acting, water-soluble magnesium readily available to plants before it's *too late for top profits;* and (3) how the SPM seal guarantees that your premium fertilizer contains Sul-Po-Mag.

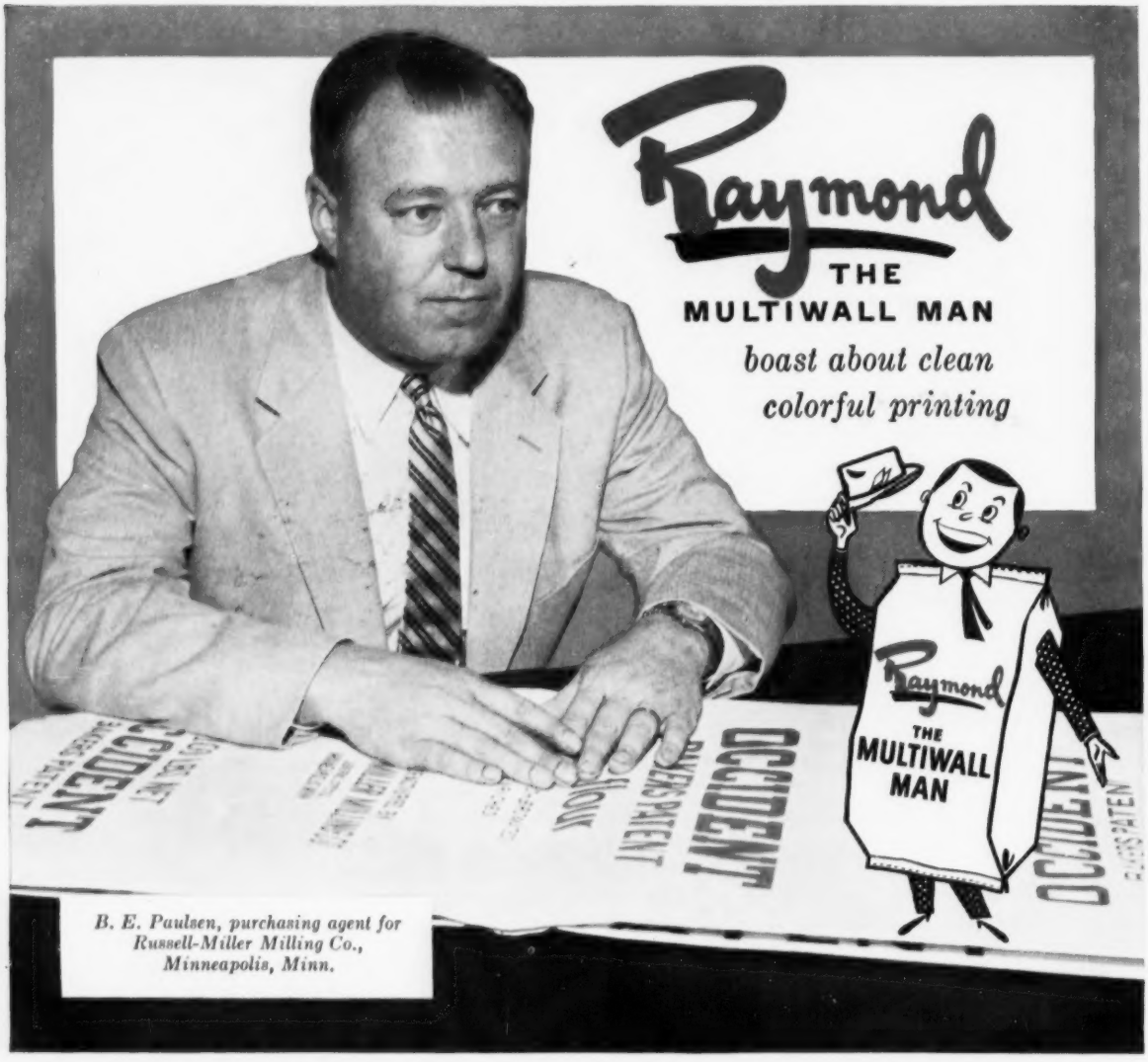
Use the SPM seal to help make sales for you . . . *now* . . . before it's TOO LATE for TOP PROFITS. See how it can bring in new pre-sold customers who will find that it pays, in bigger yields and higher quality crops, to buy your premium fertilizer containing Sul-Po-Mag.

SPM consumer advertising is aimed *specifically* to growers of citrus fruit, deciduous fruit, small fruit, vegetables, tobacco, potatoes, cotton, and many other crops . . . to potential customers in your trade area. Use SPM *pre-selling* . . . before it's TOO LATE for TOP PROFITS.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

POTASH DIVISION . . . . . 20 N. WACKER DRIVE, CHICAGO 6, ILL.

B. E. Paulsen of Russell-Miller Milling Co. listens to . . .



B. E. Paulsen, purchasing agent for Russell-Miller Milling Co., Minneapolis, Minn.

Raymond's clean, colorful printing means exact matching of company colors and accurate reproduction of trademarks, brand names and sales messages. Let a Raymond Representative show you.

Some of the Raymond Representatives at Your Service

R. G. Roberts
Chicago, Ill.

W. R. Raleigh
Chicago, Ill.

R. J. Stevens
Chicago, Ill.

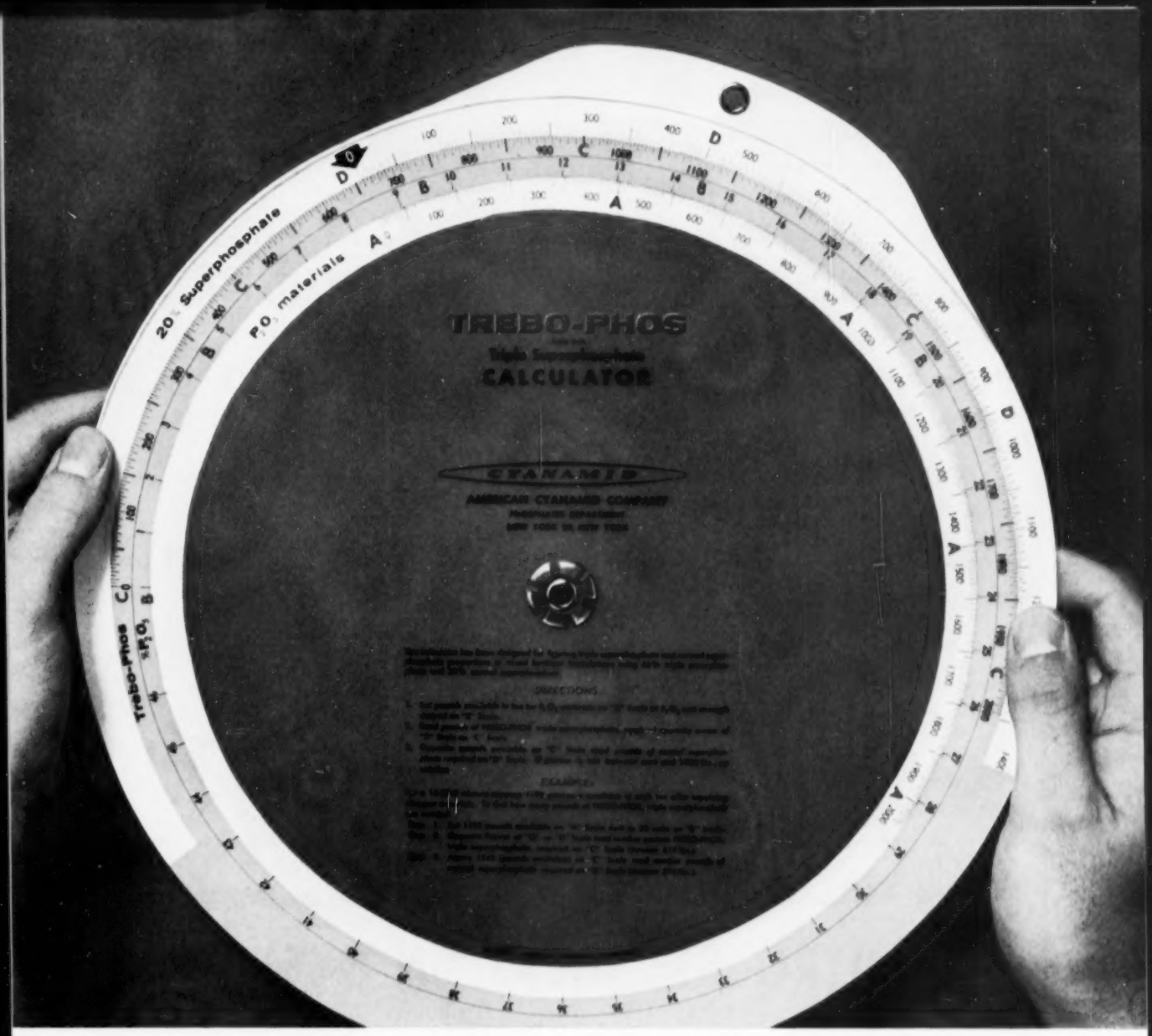
H. L. Gulden
Minneapolis, Minn.

R. T. Brown
St. Louis, Mo.

RAYMOND BAG CORPORATION

Division of Albemarle Paper Mfg. Co.

MIDDLETOWN, OHIO • RICHMOND, VIRGINIA



Superphosphate Calculator simplifies your mixing problems

...it's yours, courtesy of TREBO-PHOS*

TRIPLE SUPERPHOSPHATE

A precision instrument made of heavy-gauge plastic, this Trebo-Phos Calculator tells you in seconds the proportions of single (20%) and triple super you need to fill out any mixed goods formula. Saves your time, insures accuracy. *To get your free TREBO-PHOS CALCULATOR, simply write us.*

The Calculator works equally well on all brands of triple and single (20%) super. Naturally, we're looking forward to your calculating Trebo-Phos Triple Superphosphate for your mixes. We're proud of Trebo-Phos because our newly-built, ultra-modern plant produces Triple Superphosphate of superb uniformity and grade and high ammoniating quality. And, we're sure our prompt deliveries will please you.

*Trademark

CYANAMID

SAMPLE PROBLEM . . .
SOLVED IN SECONDS!

For a 16-20-0 mixture suppose 1195 pounds is available in each ton after supplying nitrogen materials. To find how many pounds of Triple are needed:

STEP 1. *Set 1195 pounds available on "A" Scale next to 20 units on "B" Scale.*

STEP 2. *Opposite Pointer at "O" on "D" Scale read number pounds triple superphosphate, required on "C" Scale*
(Answer 619 lbs.)

STEP 3. *Above 1195 (pounds available) on "C" Scale read number pounds of normal superphosphate required on "D" Scale*
(Answer 576 lbs.)

FOR YOUR FREE CALCULATOR WRITE:
AMERICAN CYANAMID COMPANY • PHOSPHATES DEPARTMENT • 30 ROCKEFELLER PLAZA • NEW YORK 20, N.Y. OR BREWSTER, FLA.

JUST AROUND THE CORNER *by Vernon Mount*

SPUTNIK'S most important achievement seems to be the arousing of the US from its smug belief that we have all the know-how. We do have a lot more know-how in many fields than any other nation, but the spectacular break-through to inter-planetary travel was a shock, and took us down a peg or two, which we needed.

EDUCATORS who have been pleading for more science training also find in sputnik a new point for leverage for their programs.

POLITICS has taken on a different hue, too, with the pointed question:—Who let it happen and why?

INTERNATIONAL relations will be affected until we break through some other barrier, of equal dramatic force. Which we will.

Yours faithfully,

Vernon Mount

Call TULL in ATLANTA when installing or repairing a

NITROGEN SOLUTION SYSTEM

Because—

WE KNOW OF NO OTHER PLACE WHERE A SIMPLIFIED PACKAGE OF CERTIFIED COMPONENT PARTS CAN BE FURNISHED FOR IMMEDIATE SHIPMENT.

Each part is guaranteed to give 100% service in the corrosive atmosphere of Nitrogen Solution.

So Why Take A Chance on picking up items from miscellaneous sources. Purchase parts that are matched and guaranteed by the oldest supplier of fertilizer plant fittings.

Send For Your Booklet, "The Installation and Operation of a Nitrogen Solution System," to P. O. Box 4628, Atlanta 2, Ga.

J. M. TULL METAL & SUPPLY COMPANY, INC.

285 Marietta St., N.W. JAckson 5-3871 Atlanta 2, Ga.

Branch Warehouses

BIRMINGHAM JACKSONVILLE MIAMI TAMPA

Problem:

"Freeing" imprisoned products

It's no easy job to open and empty ordinary paper bags that contain chemicals and rock products such as cement. Hard-to-open bags consume time . . . multiply handling costs . . . and retain a wasteful residue of the product after emptying.

Fulton's Solution:

Bags that zip open in an instant

Ful-Zip® multiwall paper bags—with built in rip-cords—zip open like a pack of cigarettes. These bags can be turned inside out for complete emptying . . . reduce labor time . . . and cost only a fraction more than regular bags.

For your packaging or protection problem . . .
Let our Special Services Division show how Fulton products can answer your requirements. We manufacture a complete line of multiwall paper and textile bags, industrial fabrics and made-up textile items. Write: 1418 Annunciation Street, New Orleans, La.

Fulton
BAG & COTTON MILLS

ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY • MINNEAPOLIS
NEW ORLEANS • NEW YORK • OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAVANNAH

THERE'S A *BLUE VALLEY* GRANULATION UNIT ENGINEERED FOR YOUR PLANT...

Large or small . . . there's a Blue Valley Granulation unit that will produce quality granular fertilizer at the lowest cost in your plant. Important reasons why manufacturers choose Blue Valley are . . .

BLUE V

BLUE VALLEY EQUIPMENT MFG. AND ENGINEERING CO.
LAURENT AND N. TAYLOR
TOPEKA, KANSAS

. . . Blue Valley engineers are constantly working under actual operating conditions to provide the lowest formulation costs for their customers by using the lowest cost raw materials economically possible.

. . . Blue Valley offers economy! Blue Valley Granulation units cost less to buy, install, and operate.

. . . The installation of Blue Valley Granulation units does not require a major equipment change. Double screening provided to meet your requirements with a minimum of recycle.

. . . Blue Valley offers heavy, dependable equipment for efficient operation, and with practical, visual control of the granulation process. Don't hesitate . . . investigate today!

For manufacturers merely wishing to cool and condition their fertilizers before going to storage, Blue V cooling units provide a dependable, economical, and efficient cooling operation. The cooling equipment can be incorporated into a complete granulation installation later.

New from Sohio

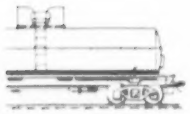
the solution for granular fertilizers

SOHIOGEN 16

(41.4% nitrogen)

saves up to $1.00 per ton in materials and manufacture

Sohiogen 16 . . . another pace-setting Sohio solution, developed by research, to match the fast changing scene in the fertilizer industry. And it's yours with a long list of benefits for granular manufacture . . .



- ★ **High fixed-to-free ratio — you can use more solution without over-ammoniation . . . require less acid neutralization.**
- ★ **Low salting out temperature — Sohiogen 16 is easier to handle and work with. Reduces storage problems. Low vapor pressure, too.**
- ★ **Produces hard granules — one size for ideal drillability, good storage. Minimum recycle ratio.**
- ★ **High nitrogen, low water content — reduces shipping costs, drying costs of finished goods.**
- ★ **Free-flowing, conditioned granules — result from perfectly adjusted Urea-Nitrate balance. Permits high solution usage with low moisture absorption of finished product.**

Sohiogen 16 has been tried and proved in full-scale, multi-plant manufacturing operations. Extensive tests show it can supply all of the nitrogen for granular fertilizers up to 12% — in some instances up to 15%.

For complete details call the "Man from Sohio" . . . see how new Sohiogen 16 can make money for you.

. . . we're serious about SERVICE at Sohio

SOHIO

SOHIO CHEMICAL COMPANY

FT. AMANDA RD. • P. O. BOX 628 • LIMA, OHIO

THE MAN WITH THE ★ MULTIWALL PLAN

UNION
PACKAGING SPECIALIST
J. R. GARMON

takes 40,000 lbs. off a packer's shoulders

Lifting twenty tons of filled bags a day is a lot of labor. It's inefficient, too, as a large chemicals producer learned during a recent survey of his Multiwall operation made by Union Packaging Specialist J. R. Garmon.

Garmon suggested a new system of *sliding* the customer's bags from the check-weigh scale to the bag flattener. This would not only relieve packer fatigue of manually lifting a 40,000 lb. bag load each day, but also assure full-capacity, full-time operation of the bagging equipment.

Union Multiwall Recommendations are based on this 5-star Packaging Efficiency Plan

- **DESIGN**
- **EQUIPMENT**
- **CONSTRUCTION**
- **SPECIFICATION CONTROL**
- **PLANT SURVEY**

Another recommended economy tip: redesign style, proportion, and construction of existing multiwall bags. This will result in annual savings of $1400 to $8000 for each 450 M of the various size bags used.

Such savings are not unusual when Union's 5-Star Packaging Efficiency Plan goes to work for a company. Write for complete information about this Plan. It costs nothing. There is no obligation.

Better Multiwall performance through better planning

UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS
UNION BAG-CAMP PAPER CORPORATION
233 BROADWAY, NEW YORK 7, N. Y.

A REPORT FOR YOU ABOUT Hi-D® AMMONIUM NITRATE

DEALERS PREFER Hi-D

"The rapid acceptance and demand for Hi-D was amazing."

"Hi-D is a better product in good bags."

"Arrived in better shape and stored better for a longer period."

"First time farmers have ever specified a brand of ammonium nitrate."

"Hi-D bags stand out well in warehouse. Farmer notices them as soon as he walks in."

"We've had really good reports about the product from our Hi-D customers."

"When farmers asked for ammonium nitrate, we sent them Hi-D. We were surprised at the number who insisted on Hi-D when they re-ordered."

"The spring advertising campaign sure built farmer recognition for Hi-D."

FARMERS PREFER Hi-D

"Really prefer the Hi-D granules in our field machinery over other kinds of ammonium nitrate."

"The men all like the way Hi-D handles. Hi-D throws nicely. What we don't use at once stores very well."

"Best moisture-proof bag I've ever seen. Used Hi-D on coastal Bermuda grass and corn, plus oats and rye in winter. A really free-flowing material, you never get too much or too little. Hi-D is always in good condition even after storing."

PILOTS PREFER Hi-D

"Hi-D arrives dry and stays dry. Flows evenly from start to finish. Plane hopper holds up to 25% more material. Saves me air time."

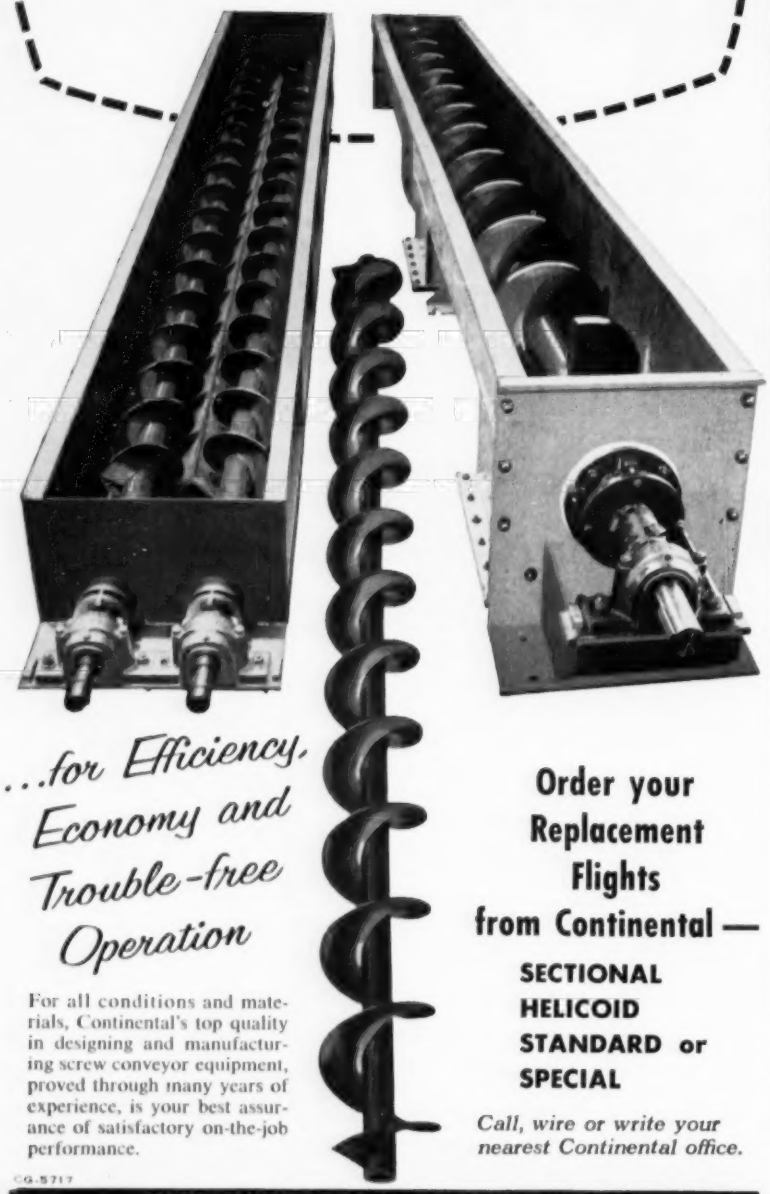
"More pounds of Hi-D in the hopper saves air time. Really flows nice. Fly at 30 feet with prills, 36 feet with Hi-D which means fewer times through a field, more profit per job."

"Hi-D is always dry when we open it. Flows regularly from start to finish – no bridging in the hopper. Shuts off fast. No bind due to dust."

IT'S EASY TO SEE THAT IT'S EASIER TO SELL Hi-D!

A PRODUCT OF **COMMERCIAL SOLVENTS CORPORATION** 1817 WEST FULLERTON AVENUE, CHICAGO 14, ILL.
STERLINGTON, LA. • 344 WILLIAMS ST., N.W., ATLANTA, GA. • 7890 FOLK AVE., ST. LOUIS, MO. • TERRE HAUTE, IND.

Specify
Continental
Screw Conveyors



...for Efficiency, Economy and Trouble-free Operation

For all conditions and materials, Continental's top quality in designing and manufacturing screw conveyor equipment, proved through many years of experience, is your best assurance of satisfactory on-the-job performance.

Order your Replacement Flights from Continental —

SECTIONAL
HELICOID
STANDARD or
SPECIAL

Call, wire or write your nearest Continental office.

CG-5717

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

CGC ATLANTA CLEVELAND DALLAS KNOXVILLE MEMPHIS MOBILE NEW YORK 17

FAO Reports World Farm Output Gains of 3%

World agricultural production again kept a short step ahead of the rate of population increase in 1956-57, the Food and Agriculture Organization (FAO) reports. The slight gain of population continued a trend noted in the past four years, and was expected to continue in 1957-58.

The 1957 FAO report on "The State of Food and Agriculture," says world production increased by about 3 per cent in the past year—slightly above the rate of population growth, which is estimated at 1.6 per cent per year. It notes that the rate of increase in production in each of the less developed regions has been, since the period 1948-52, above the average for the world as a whole, while increases in the developed regions have generally been less rapid.

"While most of this difference is offset by the more rapid growth of population in the less-developed countries," says FAO Director-General B. R. Sen in a foreword to the report, "indications are that they have at least held their own. But the distance to be traversed is still so great that any progress so far is negligible. There can therefore be no slackening of efforts made to raise nutritional levels. Inadequate and unbalanced diets are still the common lot of more than half the world's population, even though the threat of actual famine has receded."

Corrosion Study Reported To ACS by TVA Researchers

Techniques by which liquid fertilizer mixtures can be made and distributed without undue corrosion of equipment were described at the recent meeting of American Chemical Society's Division of Fertilizer and Soil Chemistry.

The corrosion behavior of liquid mixes is not so well understood, and there is great uncertainty as to the best choice of metals for processing equipment, Dr. J. D. Hatfield of Tennessee Valley Authority, told the group. For the most part industry has been using combinations of stainless and mild steel. These appear to be satisfactory except for their cost.

Dr. Hatfield described work in which the effect of liquid mixes on aluminum was investigated under a wide range of conditions with consideration given to the ingredients making up the mixtures, varying temperatures, aeration of solution,

Arcadian® News

Volume 2 | For Manufacturers of Mixed Fertilizers | Number 11

A METHOD OF SOLVING GRANULATION PROBLEMS

PREDICTS EFFECT OF VARIOUS FACTORS ON LIQUID PHASE

Nitrogen Division Research Laboratories are developing information which can be used to predict the effect of changes in raw materials, water content, ammoniation rate, and formulation on the liquid phase of granular mixed fertilizers.

Information on how the liquid phase varies in a mixed fertilizer with changes in operating conditions and raw materials can be very useful, especially to the manufacturer faced with the problem of deciding which raw material or formulation to use for a given grade of fertilizer.

Formulation Changes Necessary

The fertilizer manufacturer of today must make many changes in formulation due to variations in costs and availability of raw materials, and because of the demand for many new higher-analysis grades. The frequency of these changes points directly to the need for some method to predict their effect on processing and product quality. Because most of the factors that affect the processing characteristics of a mixture and the end product quality are related to the liquid phase, an understanding of how this factor varies under different conditions is highly desirable.

The first step in determining the liquid phase of a granular mixed fertilizer is to predict the soluble salts in the fertilizer from the composition of the raw materials and the reactions that occur during processing. A measure of the liquid phase is then determined by holding a mixture of these soluble salts and water found in the final product at constant temperature, separating the liquid from the excess solids, and analyzing for water to determine the ratio of water to salt present in the liquid phase.

Research Program Organized

Using this method, Nitrogen Division recently organized a research program to study the effects of changes in liquid phase on the manufacturer of granular mixed fertilizers. The study covered a wide range of formulations, raw materials, and grades. This involved a great deal of laboratory work to determine the liquid phase relation for a number of complex salt systems found in mixed fertilizer. An electronic computer was used for the lengthy calculations involved in formulating and predicting product composition.

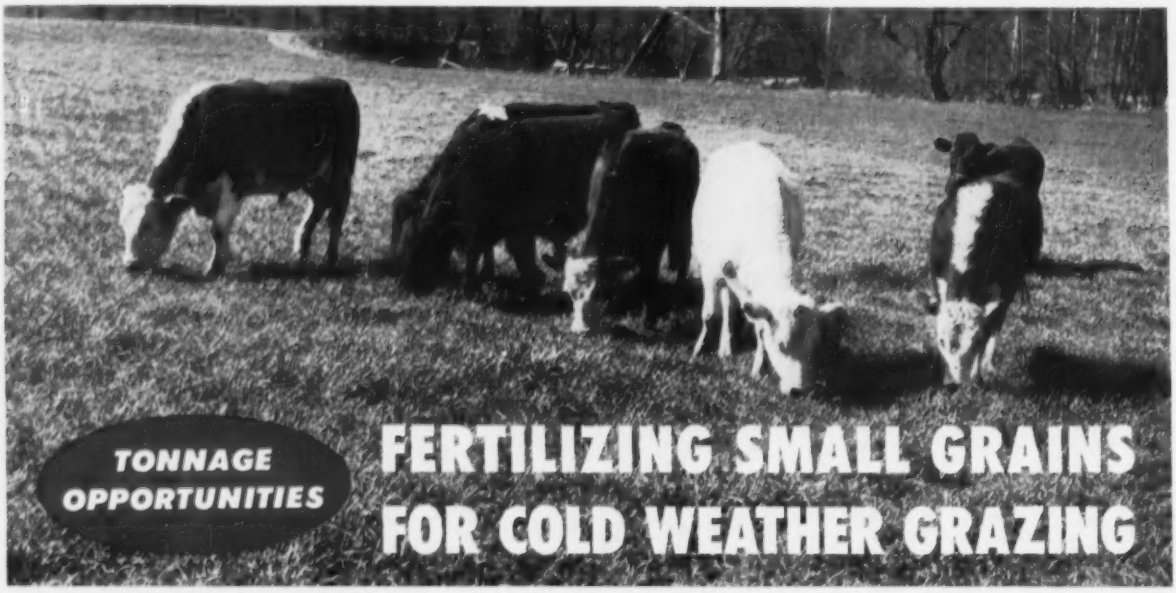
Application of Data

Data from this study is proving extremely valuable in explaining many observed differences in the storage and handling characteristics of various granular mixed fertilizers.

Nitrogen Division's work indicates that there is little place for generalizations in solving problems encountered in granulating mixed fertilizers. While two problems may appear to be the same, a close analysis may show that due to the difference in only one factor, the answers to the problems are entirely different.

Perhaps you are encountering mixing or conditioning problems in the manufacture of a concentrated or granular fertilizer. All of this recent data obtained by Nitrogen Division is now available to help you. Why not call on experienced Nitrogen Division technical experts for assistance? These men will help you in predicting the effect of changes in raw materials and processing conditions on your fertilizer manufacturing operations. It will pay off in a better, more profitable plant operation.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION



TONNAGE OPPORTUNITIES

FERTILIZING SMALL GRAINS FOR COLD WEATHER GRAZING

Grazing cattle on small grains during cold weather has been a common practice in the South for many years. Southern farmers discovered a long time ago that proper fertilization of small grains will produce fall, winter and early spring grazing plus a grain crop later.

Lately the practice has been spreading to colder climates. Experiment stations are testing it and farmers are trying it. Wherever it proves profitable, it expands fertilizer markets and helps to make the fertilizer business more of a year-round business.

Even in the Northeast, farmers are getting extra weeks of nutritious grazing from better-fertilized small grains. New, hardier varieties of winter oats are now being grown north of the Mason-Dixon line. New, vigorous strains of rye and Hessian-fly-resistant wheat make early and late seedings of grain a better bet to produce both grazing and a grain or cover crop.

In California, wheat experts are perfecting a perennial wheat which, with heavy fertilization, should produce two or more years of grain, followed by more years of good grazing—all from one seeding.

When experiment stations recommend grazing small grains they advise heavier fertilization. This means more mixed fertilizer at seeding and larger quantities of nitrogen or mixed fertilizer as top-dressing.

Extra fertilizer pays several ways. For fall grazing, it encourages earlier growth of lush, nutritious green feed. It keeps the grain growing later into the fall, as cold weather is offset by readily available plant food. Earlier stooling out and heavier growth with fertilizer assure good ground cover and strong roots to carry the grain crop through the winter after part of the foliage has been grazed off. Extra fertilizer also encourages earlier growth in late winter and spring.

Spring Fertilizer Needed

Tests as far north as New Jersey show that fertilized winter wheat produces a better yield of grain if the heavy fall growth is grazed down. Spring grazing, however, must be carefully controlled, and extra fertilizer applied, to assure a good grain harvest after grazing.

Fertilizer helps small grains produce feed with high nutrient value and beef cattle, dairy cows and other livestock love it. It helps provide low-cost feed for many weeks when no other grazing is available. By producing two crops from one sowing, it cuts labor costs and increases total yields per acre. On fertile soils, grazing also reduces lodging and makes grain harvest easier.

Cropping methods vary from South to North, but the extra fertilizer is needed everywhere. Small grains seeded in sod, and following cash crops, are typical through the South and in many specialized crop areas. Further North, some farmers sow spring oats in early fall to provide good grazing until hard frost. They may sow rye, winter oats or wheat late, to get early spring grazing along with a grain crop. Or they may combine an oats seeding for fall feed with a winter grain for spring grazing plus a grain harvest.

Increased grazing of winter grains is building fertilizer markets. As livestock production expands, and farmers search for efficient new ways to grow feed, new sales opportunities develop for fertilizers.

Valuable New Book For Fertilizer Men

"SOIL" the 1957 Yearbook of Agriculture, recently published by the United States Department of Agriculture, is packed with timely and useful information helpful to everyone concerned with the manufacture and sale of fertilizers.

Fertilizer agronomists and salesmen will find this book a valuable aid in assisting their farm customers to obtain greater benefits from the proper care and fertilization of soils. It is non-technical and easy to read and understand.

The book concentrates on efficient soil management and presents new and comprehensive information on this subject. Of particular interest to fertilizer men are the sections on nutrient needs, fertilizer manufacture and use, major and secondary plant foods, trace elements, fertilizer application, fertilizer economics, etc.

This 784-page volume is a veritable treasure house of facts that every fertilizer man should know. Available at only $2.25 per copy from Superintendent of Documents, Government Printing Office, Washington 25, D. C. It's so popular the supply will probably be exhausted fast.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

How To Sell Yourself On ADVERTISING

To convince yourself that your company needs to advertise, it will pay you to use many of the same arguments that convince a farmer that he needs to fertilize. The function of advertising is very similar to the function of fertilizer.

Fertilizer grows crops, advertising grows sales. Both are great multipliers; they multiply success. Neither fertilizer nor advertising is a cure-all. Everything else essential to the end result must be functioning properly to get the greatest benefit from fertilizer or advertising.

To produce the best returns with fertilizer, the farmer must start with good seed. He must cultivate his field properly. He must protect his crop from insects. He must have reasonably good weather conditions. He must have some one there to harvest his crop when it's ready for picking.

To produce the best returns from advertising, the business man must start with a good product. He must cultivate his market properly. He must protect himself from competition. He must have reasonably good economic conditions and he must have salesmen out asking for orders.

To produce bigger sales, advertising must be used in the proper balance and in the right amounts at the right times, just as fertilizer must be used in the right balance in the right amounts at the right times to produce bigger crops.

It's just as difficult to sell advertising to a business man who has never used advertising and doesn't believe in advertising as it is to sell fertilizer to a farmer who has never used fertilizer and doesn't believe in fertilizer.

The easiest man to sell fertilizer is a man who has used a lot of it over a period of years and has discovered what it will do for him. The same is true of advertising.

There is just as much prejudice against advertising among business men as there is prejudice against fertilizer among farmers. Most of the criticisms that have been leveled against advertising by business men have also been used against fertilizers by farmers: "***It's too expensive. I can't afford it. It's a necessary evil. I can remember when I produced all the profits I needed without it. Lots of folks get along all right without it. Think how much more I would make if I could save that money.***"

Some farmers are convinced that fertilizers are no good because they have used 100 pounds per acre without seeing any results. Some business men are convinced that advertising is no good because they have used small amounts in a big market without seeing results.

There has been far more money wasted by using too little fertilizer than by using too much fertilizer. The same is true of advertising. You have to use a very heavy application of fertilizer per acre before you reach the point of diminishing returns. The same is true of advertising.

When a farmer uses plenty of fertilizer and gets a big crop, fertilizer seldom gets credit for it. He's just a good farmer with plenty of money. When a business man uses plenty of advertising and gets big sales, advertising seldom gets credit for it. He's just a good business man who knows how to hire good salesmen.

You can condition a market by plowing in advertising just as you can condition a soil by plowing in fertilizer. You can build a better farm with fertilizer. You can build a better business with advertising.

The crop-producing power of the soil will soon disappear if you stop using fertilizer. Consumer demand for your product will soon disappear if you stop advertising. You have to keep replenishing your market with advertising, just as you have to keep replenishing your soil with fertilizer.

When the farmer uses enough of the right fertilizer at the right times, he gets a far greater return from all of his other investments and efforts. The business man can get exactly the same results from properly-directed advertising used in sufficient quantities.

MIXED FERTILIZER POSTER

Large posters similar to this in full color are now appearing on hundreds of billboards in leading farming areas. Small, full-color reproductions are available as long as the supply lasts, first come first served. Request these (11 inches long or 30 inches long) from Nitrogen Division, Allied Chemical, 40 Rector St., New York 6, N. Y. Can be used as window streamers or posters. Supply is limited; order early.

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get technical assistance and formulation advice from the largest and most efficient staff of nitrogen experts. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. in. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION Allied Chemical & Dye Corporation

MAIN OFFICE: 40 RECTOR STREET, NEW YORK 6, N. Y., PHONE HANOVER 2-7300

Hopewell, Va., P. O. Drawer 131 ..... Cedar 9-6301
Ironton, Ohio, P. O. Box 98 ..... Ironton 8-4366
Omaha 7, Neb., P. O. Box 166 ..... Bellevue 1464
Raleigh, N. C., 16 W. Martin St. ..... Temple 3-2801
Columbia 1, S. C., 1203 Gervais St. ..... Columbia 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
Columbia, Mo., P. O. Box 188 ..... Gibson 2-4040
Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869 ..... Kalamazoo 5-8676
St. Paul 4, Minn., 45 N. Snelling Ave. Midway 5-2864
San Francisco 4, Cal., 235 Montgomery St. Yukon 2-6840

type of alloy, and effect of inhibitors. Significant increases in corrosion rates were observed when the phosphate content of the solution was increased or when the temperature was raised, he said.

Aluminum was found to be in a marginal category in regard to its suitability for liquid fertilizers, the chemist reported. Under some conditions it was fully acceptable, but under others, the corrosion rate was high. Between these extremes several combinations gave corrosion rates which may or may not be acceptable, depending upon conditions which vary from plant to plant.

Though some pitting of the metal was observed, the use of sodium dichromate in the presence of potash reduced corrosion to the point where a low over-all rate of damage was indicated for all conditions tested, he said.

Other favorable factors for processing liquid fertilizers were the use of a cooler to bring the mixtures down to a generally non-corrosive level before storage or shipment, and limiting the time of exposure for transfer and application equipment. Dr. Hatfield also pointed out that careful washing of equipment in use only a few months per year could extend the acceptable service life of the metal even when the corrosion rate was relatively high.

Co-authors of the report — also from Tennessee Valley Authority— were A. V. Slack, chief of the program development staff; G. L. Crow, metallurgical engineer, and H. B. Shaffer Jr., chemist.

Tree Farming Increasing, Reaches 45 States

More than 800 tree farms covering over 1,500,000 acres of land, have been started within the past year, Stuart Moir, Portland counsel for the Western Forestry and Conservation association, said, addressing the opening session of the 35th annual convention of the Association of State Foresters at Longview, Washington.

States have now awakened to their duties in forestry, he said, but the job of educating the public to conservation and forestry practices is yet unfinished.

There are now 45 of the 48 states sponsoring forest conservation and tree farm programs, Mr. Moir said. Proper tree farm management and creation of a fire-conscious public are the first steps in a strong soil conservation program, he added.

MURIATE OF POTASH for the PLANT FOOD INDUSTRY

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

61 BROADWAY • NEW YORK 6, N. Y.

Very little has been known about the characteristics of the non-farm fertilizer market. Official statistics are meager. The use of fertilizer for other than farm purposes has been increasing rapidly in recent years and has become a significant factor in total fertilizer consumption. As a result, the National Plant Food Institute arranged with Arnon L. Mehring, one of the country's leading authorities on fertilizer statistics, to make a study of the non-farm market. This article presents the results of this study. Continuing the discussion of the Non-Farm Market, which began in our October issue, we think you will find worth reading this authoritative article slated to appear in the Fall issue of NPFI's "Plant Food Review."

characteristics of the

Non-Farm Fertilizer Market

by Arnon L. Mehring*

How much fertilizer is bought each year by non-farm users in the United States?

Nobody knows for sure. But this growing market probably takes 2-2.5 million tons, or at least 10 percent of the 20-odd million tons current total annual consumption.

At a conservative average price of $75 per ton, the non-farm market adds up to a whopping $150 million to $187.5 million annually. Some estimates are even higher.

While most attention has been focused on the rapid expansion in farm use of fertilizer, which has been variously described as spectacular or phenomenal, non-farm use has been spurting upward twice as fast. Moreover, while total consumption has tended at least temporarily to level off in the last two or three years, non-farm use probably has continued to climb.

As important as this segment of the fertilizer market has become, most authorities believe that there still remains a considerable untapped potential. The trend toward suburban development of both residential and industrial of formerly agricultural lands, the vast highway building program, expansion of public parks, playgrounds and recreational areas—these and many other factors create new opportunities for non-farm fertilizer use. Add to this an increasing awareness on the part of the non-farm population of the advantages of using fertilizer on turf, flowers, trees, shrubs and home gardens, and the outlook can be conservatively described as "very encouraging."

Despite its importance, very little is known about the characteristics of the non-farm market. Official statistics are meager.

Most fertilizer used for non-farm purposes is bought from retail stores such as hardware dealers, garden supply stores, nurseries, fuel dealers, supermarkets, drug stores, etc. It is probable that at least 120,000 retail dealers sold fertilizer in 1956. It is impractical to make a direct census of dealers or consumers, except on a sample basis, because of the enormous number of people involved.

Most of these dealers buy at least part of their fertilizer—probably most of the "specialty" goods — from wholesalers. In many cases, these wholesalers are located in another State or county. Manufacturers, therefore, are not able to determine what proportion of the fertilizer they ship to wholesalers, jobbers and dealers is used for any specific purpose, nor even where it eventually is to be used.

This study consisted of an analysis of available statistics coupled with a new sample survey. Available statistics were used to draw some conclusions about geographical distribution of the non-farm market. The sample survey was conducted largely to determine estimated non-farm use of fertilizer by type of user.

Private homes account for about half the total consumption of fertilizer for non-farm purposes. The other 50 percent is divided among a wide variety of users, mostly public and commercial.

The breakdown of non-farm fertilizer consumption by type of user shown in Table I was based on the new sample survey. The survey included nearly 3,000 personal interviews in more than 50 cities and towns of every size and kind in 15 States east of the Mississippi. To round out the sample, 2,000 questionnaires were sent to non-farm users in other States. A detailed study was made of Washington, D. C. and its general vicinity. Care was taken in each case to secure representative samples.

About 40 percent of all non-farm homes in the U. S. used at least some fertilizer in 1956. The average quantity used amounts to a surprisingly high 51 pounds per home. Regionally, average per-home use varies from 16 pounds in the Far West to 133 pounds in the South Atlantic. (See Table II.)

Every one of the 74 golf courses included in the survey used commercial fertilizer in 1956. The quantities ranged from one ton for a 9-hole course in a city of 5,000 in Indiana to 258 tons for an 18-hole course in North Carolina. The average was 44 tons, of which 43 percent consisted of organics such as activated sewage sludge, processed tankage, cottonseed meal, tobacco stems and dried manure. About one-fifth of the superintendents used some urea-formaldehyde products on their greens.

Most of the large airports, including both commercial and military, used commercial fertilizer in 1956. The airports covered in the survey averaged 216 acres of turf. Maximum usage encountered was 138 tons. Most small ports, patronized by light weight or private planes, used relatively little fertilizer except when originally constructed.

While most industrial plants use little or no fertilizer, a few use relatively large quantities. This accounts

* *Arnon L. Mehring presently is a private fertilizer consultant. He formerly was Senior Chemist and later Fertilizer Staff Specialist with the U. S. Department of Agriculture in charge of fertilizer statistics.*

for the large "standard error" in this category. One New Jersey plant used over 100 tons on lawns and shrubbery during 1956. Statistically it is considered unlikely that the actual non-farm consumption would have varied from that reported in the table by more than the amount of the standard error.

The standard errors also are relatively large for municipal parks, athletic fields, resort hotels and some other types of users either because of the small number included in the sample, or the wide range in size of fertilizer areas. For example, the park area of the 43 cities and towns included in the survey which used fertilizer varied from 0.1 acre to over 5,000 acres. Of the six cities sampled that used no commercial fertilizer in parks, five were under 25,000 population, and four of the six used sewage sludge from their own disposal plants.

Of the 32 State Highway Departments responding to the survey, 26 used fertilizer and 6 used none. Of those that did not report, most are thought to have used little or none. Total highway use in 1956 is estimated to have been 21,868 tons. Seven States alone (N. C., Ga., Ohio, Fla., N. Y., Miss., and Wisc.) accounted for nearly 15,000 tons, or two-thirds of the total in the present survey.

Total consumption by State Highway Departments in 1940 is reported by the National Research Council to have been 7,733 tons at a cost of $185,276. A survey conducted by the Journal of Agricultural and Food Chemistry indicates that 29 States spent about $895,000 for fertilizer in 1956 and that 31 States expected to spend $1,148,700 in 1957. The new 41,000 mile Interstate highway program, construction of which is to be spread over the next 9 to 13 years, is expected to increase greatly the use of fertilizer for roadside development purposes. The new highways will average 22 acres of turf per mile, or a total of 900,000 acres. If this total acreage were to be fertilized at the average 1956 rate, it would require 186,300 tons for initial turf establishment only.

The Fish and Wildlife Service used 742 tons of fertilizer in 91 fish hatcheries in 1956. Fertilizer is used only in hatcheries for warm water fish, so that none was used in the northernmost States.

Farm fish ponds were not included in these data, but it is estimated that more than 100,000 tons of fertilizer are used in farm ponds annually. About 70 percent of all farm ponds contain fish, and about 60 percent of these are fertilized regularly.

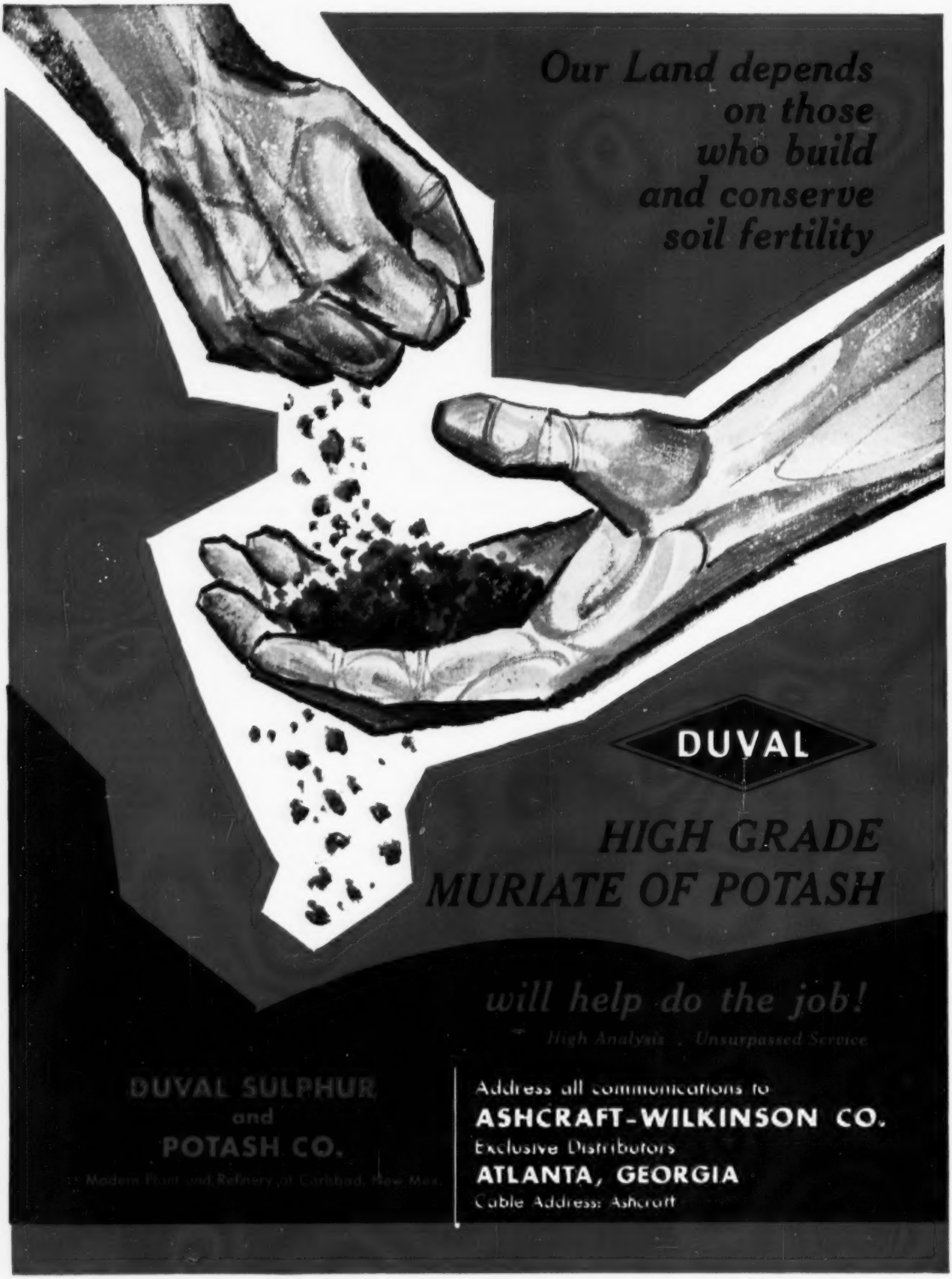
The four recreational camps sampled all used fertilizer, and one of the fishing camps used a relatively large quantity. It is probable, however, that many of the summer camps for children use little or none.

The figure of 20,000 tons assigned to the "all other" category is purely

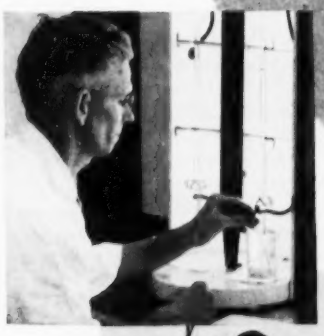
Table 1. Estimated U. S. Total Non-Farm Fertilizer Consumption by Types of Consumers, 1956[1]

Type of Consumer	Reports (No.)	Proportion Using Fertilizer (Percent)	Average Amount Used (Lbs.)	Average Area Fertilized (Acres)	Average Application Rate[2] (Lbs. per Acre)	Total Consumers (Number)	Total Consumption[3] (Tons)	Standard Error (Tons +)
Homes	1,621	45.	51	0.1	503	43,136,000[4]	1,099,968	+90,586
Golf Courses	74	100	88,121	68.	1,296	4,504[5]	198,626	11,651
Airports	412	75	45,164	216.	209	6,839	154,438	20,520
Athletic fields	13	92	7,065	8.	883	40,208[6]	142,035	55,380
Industrial Plants	180	16	8,495	5.	1,699	22,000[7]	93,445	78,870
Municipal parks[8]	49	88	95,027	608.	156	1,907	90,608	28,510
High Schools	10	80	4,028	8.	503	27,068	54,515	29,599
College campuses	29	86	26,222	52.	504	3,260	42,742	8,253
Seasonal hotels	11	73	24,182	18.	1,343	3,418	41,327	40,223
Government buildings[9]	22	64	1,542	1.6	969	50,000[7]	38,550	21,800
Churches	48	50	209	.2	1,045	300,056	31,356	9,602
Highways	32	80	892,591	2,157.	414	49	21,868	686
Hospitals	12	75	5,080	9.	678	6,956	17,668	8,500
Grade schools	258	54	185	.5	370	134,429	12,440	1,748
Cemeteries, city and church type[10]	17	71	2,400	13.	185	10,000[7]	12,000	4,250
Commercial buildings	433	5	7	.01	700	3,000,000[7]	10,500	2,150
Tourist courts	56	77	671	.9	686	29,432	9,874	1,560
Memorial cemeteries	36	100	18,234	22.	829	1,000[7]	9,117	3,232
State and country parks	44	61	5,342	10.	534	3,187[11]	8,513	2,236
Recreational Camps[12]	4	100	1,970	1.7	1,157	8,392	8,266	2,694
Clubs, lodges, and other organizations	10	80	132	.2	660	50,000[7]	3,300	2,175
Fish hatcheries, Government[13]	28	96	93,618	117.	828	35	2,388	100
Fish hatcheries, Commercial	13	84	9,295	34.	396	152	704	405
All other[14]	0						20,000	
Total							2,124,248	

[1] Based on a sample survey conducted for the National Plant Food Institute.
[2] Average amount used divided by average area fertilized.
[3] Average amount used multiplied by total consumers in each class, divided by 2,000 to convert to tons.
[4] Urban and rural non-farm households. March 1956 Census, Series P—20, No. 76.
[5] Census of Business, 1955. Includes 1,014 commercial courses, 2,965 membership clubs, (Recreation & Park Yearbook, 1956); 478 municipal and county, and 16 state.
[6] Recreation & Park Yearbook, 1956. Includes 153 State and 23,961 municipal ball fields, 13,188 tennis courts and 231 bowling greens (Census); 672 commercial, and an estimated 2,000 colleges.
[7] Estimated.
[8] Recreation & Park Yearbook. 1907 municipalities had in 1956: 20,417 parks, 10,833 picnic centers, 58 arboretums, and 614 public gardens.
[9] Capitols, office buildings, post offices, court houses, police stations, public libraries, etc.
[10] Includes 3 national cemeteries and one pet cemetery.
[11] Recreation & Park Yearbook. State parks, 1896, county parks, 847 historic sites and monuments, 444.
[12] Sample includes one girls' summer camp and 3 fish and hunt clubs.
[13] Complete enumeration for Federal government, 20 States and one city hatchery. Includes natural streams and lakes fertilized in 2 States, but not farm fish ponds. Only warm-water hatcheries use fertilizer.
[14] Estimated. Includes military establishments, levees, etc.


Our Land depends
on those
who build
and conserve
soil fertility
DUVAL
HIGH GRADE
MURIATE OF POTASH
will help do the job!
High Analysis . Unsurpassed Service
DUVAL SULPHUR
and
POTASH CO.
Modern Plant and Refinery at Carlsbad, New Mex.
Address all communications to
ASHCRAFT-WILKINSON CO.
Exclusive Distributors
ATLANTA, GEORGIA
Cable Address: Ashcroft

57 sample tests per hour is our way of proving GRADE UNIFORMITY



International Quality-Controlled

PHOSPHATE ROCK

For acidulation.

For industrial chemicals.

For direct application to the soil.
(Ground Rock)

468 sample tests are made every eight hours. Not surprising . . . because *International Phosphate Rock* is sampled and tested at every stage of production—recovery, blending, drying, grinding, loading. No wonder it is so highly regarded for its grade uniformity and quality. You always get fast, dependable deliveries of the grade you need, in the tonnages you want. This complete service makes it good business to depend on *International* for *Quality-Controlled Phosphate Rock*.

INTERNATIONAL MINERALS International MINERALS CHEMICALS **& CHEMICAL CORPORATION**

PHOSPHATE MINERALS DIVISION..... .....20 N. WACKER DRIVE, CHICAGO 6

PHOSPHATE MINES AND PLANTS IN FLORIDA AT NORALYN, PEACE VALLEY, ACHAN, MULBERRY; IN TENNESSEE AT MT. PLEASANT, WALES AND GODWIN

a guess and probably is accurate only to the extent of being of the proper order of magnitude. Principal users in this category are military establishments for which no figures were obtained.

It should be noted that total non-farm consumption for 1956 of 2,124,000 tons, as determined from the sample survey, checks closely with indicated 1954 non-farm consumption of 2,241,210 tons as derived from available official data. (See Table IV). While the closeness of these two figures would seem to support the validity of both, it is likely that non-farm consumption in 1956 actually was greater than in 1954.

That non-farmers as well as farmers tend to buy most of their fertilizer in large packages is indicated from a study of sales by package size in four urban communities which is summarized in Table III. In all four, the 80-pound bag accounted for most of the tonnage. Although many different kinds and sizes of bags, bottles, boxes, envelopes and tin cans containing less than 50 pounds each were sold in each place, all of them combined totaled only about three percent by weight each in Winchester, Virginia and Prince Georges County, Maryland (a Washington, D. C. suburb); 15 percent in Gettysburg, Pennsylvania, and 16 percent in Winsted, Connecticut.

It seems likely that the proportion by weight of small package sales in the smaller towns is even less than indicated in these four communities, and that the small package sales in the larger cities is greater.

Table II. Use of Fertilizer by Private Households By Regions, 1956

Region	Total Consumption[1] (Tons)	Proportion Using Fertilizer[2] (Percent)	Average Use By All Household[3] (Pounds)	Average Use Per Household Using Fertilizer[4] (Pounds)
New England	58,500	59	45	71
Middle Atlantic	235,000	33	47	142
South Atlantic	332,500	66	133	201
South Central	225,000	49	70	143
North Central	192,000	48	32	67
Western	56,000	14	16	114
TOTAL	1,099,000	40	51	127

[1] Average use per household as derived from the sample survey multiplied by the number of urban and rural non-farm households in each region and in the U. S. as derived from Census data.

[2] Weighted to reflect the proportion of the total population in the various classes of cities and towns.

[3] Derived from the sample survey.

[4] Average rate of use by all households divided by proportion using fertilizer.

The analysis of existing data presents some interesting and difficult problems.

Two principal sources of information are available. The U. S. Department of Agriculture for many years has published an annual report of total fertilizer consumption by States. Farm consumption of fertilizer is given for the years 1929, 1939 and 1954 in the respective U. S. Censuses of Agriculture.

Non-farm use of fertilizer would seem simply to be the difference between total use, as reported by USDA, and farm use, as reported by the Census. The two series are not entirely comparable, however. Even when adjustments are made for comparability, certain discrepancies appear that are not entirely explainable with available knowledge. Nevertheless, as the best data available, these series were used as the basis for this part of the study.

Total consumption, as reported by USDA, is not actual consumption. These data represent shipments by manufacturers to wholesalers, retail dealers and consumers and generally speaking are recorded at the first point of delivery regardless of where the material eventually is used.

The USDA and Census reports do not in all cases cover exactly the same materials. Moreover, the USDA report is for a fiscal year beginning on July 1, whereas the Census reports are for calendar years. Fortunately, quarterly or semi-annual data also generally are given, and the quantities of all materials used separately in amounts large enough to be significant are included separately in the statistics, so corrections can be made for these differences.

The deliveries method of estimating total consumption has another drawback. In years when dealers' stocks either are being built up or depleted, manufacturers' shipments may differ significantly from actual consumers' purchases. Fortunately,

Table III. Non-Farm Fertilizer Sales By Size of Package Selected Communities, 1956

Package Size (Pounds)	Gettysburg, Pa.[1]		Prince Georges Co., Md.[2]		Winchester, Va.[3]		Winsted, Conn.[1]	
	Packages (Number)	Proportion of total weight (Percent)	Packages (Number)	Proportion of total weight (Percent)	Packages (Number)	Proportion of total weight (Percent)	Packages (Number)	Proportion of total weight (Percent)
Less than 1	1,560	0.14	1,819	0.02	424	0.02	1,763	0.48
1 and 1½	513	.38	1,705	.09	553	.12	272	.25
2-4	570	.90	91	.01	115	.05	72	.11
5	661	1.97	1,770	.49	468	.48	866	3.32
6-9	—	—	63	.02	—	—	30	.17
10-15	293	1.64	1,957	1.08	482	1.00	599	4.59
25[4]	361	5.44	730	1.01	269	1.39	388	7.44
50[5]	745	22.72	1,921	5.29	809	8.38	543	20.82
80	1,291	63.08	19,436	85.69	4,807	79.64	908	55.69
100	61	3.73	1,142	6.30	431	8.92	93	7.13
TOTALS	6,055	100.00	30,634	100.00	8,360	100.00	4,738	100.00

[1] Complete enumeration.

[2] Estimated to be 27 percent of total sales. Enumeration included about one half of total dealers. Considerable quantities were sold in bulk and a fairly large tonnage of liquid fertilizer was sprayed on lawns by custom operators.

[3] Estimated to be 87 percent of total sales.

[4] Includes a few 20, 22 and 30 pound packages.

[5] Includes a small number of 40 pound packages.

consumption and inventories on the average were remarkably stable from 1953 to 1955. As a result it is believed that during 1954 (the latest year for which Census data on farm consumption are available) total shipments and total consumption were practically identical for the country as a whole and probably for many States.

In Table IV are shown by States for the calendar year 1954: total deliveries, farm consumption, and the difference which presumably represents non-farm consumption. Adjustments for comparability have been made as indicated above in the data for both total deliveries and farm consumption.

The total delivery data are believed to be complete and to involve little or no error, except possibly for some of the Western States. Farm consumption data, however, are based on a sample, and therefore, could be subject to error. About 27 percent of all farms in the U. S., and at least 20 percent in every State were included in the sample. As a result, a standard error was computed for the Census data and is included in Table IV.

For the country as a whole, it is believed that the indicated non-farm consumption is fairly accurate. When State figures are examined, however, obvious discrepancies appear.

Total consumption in any one State, as judged by reported deliveries may be either too high or too low because of shipments from or to the State after the initial delivery is reported by the manufacturer. In many States, this movement across State lines tends to balance and no adjustment, therefore, is necessary. However, the introduction of this factor means that total deliveries differ from total consumption by varying amounts for most States, and that in some cases the difference is substantial. There is no way to make an accurate adjustment for this factor with available data, and no such adjustment is attempted in Table IV.

It is believed that in most of the Eastern States, movements across State lines have on the average tended to balance out. For most of the Western States, except California and Arizona, and for New Hampshire and Vermont, reported deliveries appear to be lower than total consumption. In fact, for 12 States, indicated total consumption, as judged by manufacturers' deliveries, is less than farm consumption

Table IV. Indicated 1954 Non-Farm Fertilizer Consumption By States

		Farm Consumption[2]		Indicated Non-Farm Consumption	
	Total Deliveries[1] (Tons)	Total (Tons)	Standard Error (Tons)	Total[3] (Tons)	Average Per-Capita[4] (Pounds)
Maine	172,057	169,870	±5,079	2,187	6
New Hampshire	16,122	17,829	775	[6]	[6]
Vermont	44,589	45,664	1,279	[6]	[6]
Massachusetts	86,179	57,156	1,189	29,023	13
Rhode Island	15,151	5,788	509	9,363	24
Connecticut	89,799	66,827	2,196	22,972	24
NEW ENGLAND	423,897	363,134		63,545	
New York	603,079	516,900	6,511	86,179	12
New Jersey	286,149	237,580	5,826	48,569	21
Pennsylvania	702,678	608,640	4,991	94,038	19
Delaware	94,691	75,080	2,794	19,611	14
Maryland	311,879	264,630	4,207	47,249	44
D. C.	2,836	0	0	2,836	7
West Virginia	73,805	67,810	1,763	5,995	8
M. ATLANTIC	2,075,117	1,770,640		304,477	
Ohio	1,059,835	972,220	9,106	87,615	25
Indiana	1,150,491	1,051,302	5,815	99,189	61
Illinois	1,381,932	1,235,176	12,220	146,856	37
Michigan	604,577	568,407	6,278	36,170	13
Wisconsin	444,079	436,372	3,449	7,707	6
E. N. CENTRAL	4,640,914	4,263,477		377,537	
Minnesota	319,111	318,716	3,688	395	0.4
Iowa	630,560	622,372	3,485	8,188	9
Missouri	771,424	727,133	5,406	44,291	29
North Dakota	46,201	54,011	1,374	[6]	[6]
South Dakota	30,406	38,544	959	[6]	[6]
Nebraska	196,884	219,678	3,431	[6]	[6]
Kansas	233,871	228,114	3,239	5,757	8
W. N. CENTRAL	2,228,457	2,208,568		58,631	
Virginia	783,211	642,366	9,696	140,845	109
North Carolina	1,841,247	[5]1,486,224	8,552	355,023	264
South Carolina	928,334	776,745	10,827	151,589	214
Georgia	1,369,790	1,240,538	11,815	129,252	104
Florida	1,207,941	1,056,969	16,847	150,972	119
S. ATLANTIC	6,130,523	5,202,842		927,681	
Kentucky	583,193	556,880	3,859	26,313	27
Tennessee	569,535	531,456	3,549	38,079	33
Alabama	1,261,147	1,052,364	7,211	208,783	199
Mississippi	745,237	707,674	6,055	37,563	70
Arkansas	387,039	346,810	847	40,229	73
Louisiana	325,186	293,181	4,858	32,005	30
Oklahoma	131,364	126,017	3,528	5,347	6
Texas	584,387	490,740	7,754	93,640	29
S. CENTRAL	4,587,088	4,105,122		481,959	
Montana	26,879	27,432	887	[6]	[6]
Idaho	85,250	110,620	2,345	[6]	[6]
Wyoming	11,523	11,784	490	[6]	[6]
Colorado	46,596	45,958	1,599	638	1
New Mexico	24,251	28,901	1,256	[6]	[6]
Arizona	147,882	126,123	5,207	20,759	62
Utah	22,283	21,423	681	860	3
Nevada	3,009	3,285	401	[6]	[6]
Washington	154,906	156,246	2,567	[6]	[6]
Oregon	133,537	148,425	3,583	[6]	[6]
California	1,178,219	1,085,141	21,703	93,078	18
WESTERN	1,834,335	1,765,338		115,335	
TOTAL U. S.	21,920,331	19,679,121	23,418	2,241,210	35

[1] Derived from "Commercial Fertilizers, Consumption in the United States," for the years 1953-54 and 1954-55, U. S. Department of Agriculture. Consists of the figures for mixtures and materials for the two halves of the calendar year 1954 minus secondary and trace element fertilizers as shown in the 1953-54 report.

[2] 1954 Census of Agriculture, Vol. III, Part 10, Table II, adjusted for completeness: North Central States (ground phosphate rock); Alabama (basic slag); Arizona and California (natural organics). Standard error computed as indicated in State Table 18, 1954 Census of Agriculture, Vol. I.

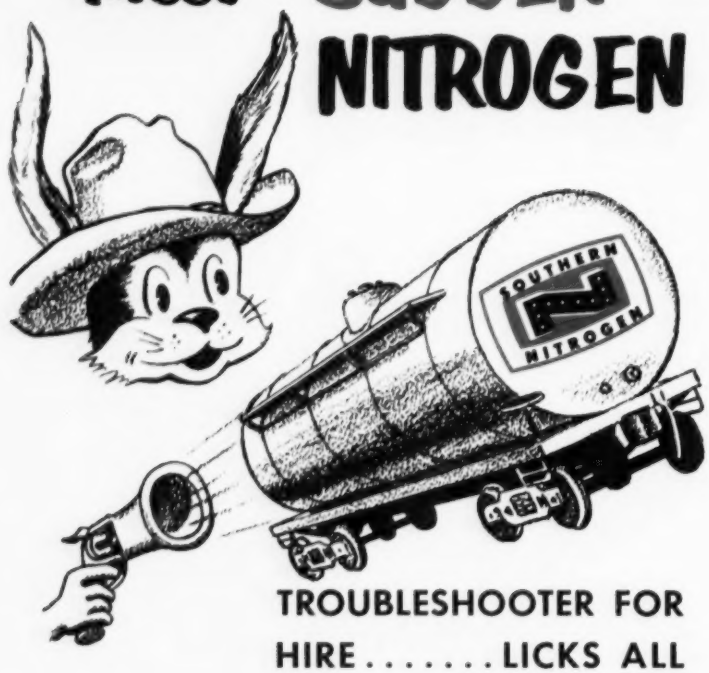
[3] Total deliveries (Col. 1) minus Total farm consumption (Col. 2).

[4] Indicated non-farm consumption (Col. 4) divided by the sum of the urban and the rural non-farm population (1950 Census), multiplied by 2,000 to convert to pounds.

[5] Census of the State Department of Agriculture.

[6] Farm consumption apparently exceeds total deliveries. Non-farm consumption in each of these States is thought to be at least 100 tons ranging up to as much as 1,000 tons in such States as Vermont and New Hampshire.

Meet "SUDDEN" NITROGEN



TROUBLESHOOTER FOR HIRE.....LICKS ALL NITROGEN PROBLEMS

FAST
as greased lightning
trusty
USES FIVE-SHOOTER

Atlantic Coast Line
Central of Georgia
Savannah and Atlanta
Seaboard Airline
Southern

SHOOTS A FULL LINE

Ammonia
Ammonia-Ammonium Nitrate
Ammonia-Ammonium Nitrate-Urea
Urea

HAS TANK CAR...WILL TRAVEL on a moment's notice. CALL AD. 3-3001

SOUTHERN NITROGEN

Southern Nitrogen Co., Inc.
P. O. Box 246 Highway 21
Phone ADams 3-3001
Savannah, Georgia

as reported by the Census. This obviously is not correct and indicates that something decidedly is wrong with the statistics for these States.

This situation undoubtedly is partially explainable by shipments to retail dealers and consumers in these States after the initial delivery from the manufacturer is recorded elsewhere. Large wholesale centers such as Chicago, Dallas, Spokane, Kansas City, San Francisco and Minneapolis cover wide multiple-State areas in the West and Far West. The relative size of the discrepancy for some of these States is so great, however, that this could hardly be the full explanation. It is possible that some substantial quantities of fertilizer may be imported from Canada and Mexico by wholesalers or by large farm users, and that these imports, therefore have not been reflected in the USDA figures for total deliveries.

It seems certain that there is at least some non-farm consumption in every State. In the case of the 12 States in question, this probably ranges from perhaps a hundred tons in States like Wyoming and Nevada up to 1,000 tons or more in Vermont and New Hampshire.

Average per-capita consumption for non-farm use probably has little meaning as such. However, it is one method of ranking the states in the order of their importance as non-farm fertilizer consumers.

When the indicated non-farm consumption is divided by the urban plus the rural non-farm population as reported by the 1950 Census, we find that the six States with indicated non-farm fertilizer consumption rates of over 100 pounds per capita all are situated in the Southeast. This is understandable. Here farm manures seldom are available. Rainfall is heavy and the growing season is long. The soils are naturally deficient in plant food. As a result, fertilizer is necessary to grow almost anything satisfactorily.

Generally, the opposite situation exists in many of the Northernmost States—particularly those in the West North Central and Pacific Northwest.

The same six Southeastern States are among the top seven in terms of total indicated non-farm consumption. The newcomer is Illinois, which ranks number five on this basis, probably because of its large urban and rural non-farm population, and also possibly because of its importance as a wholesale center.

As to inter-State movements, it is known that Oklahoma customers buy a great deal of fertilizer from Arkansas dealers, especially in Fort Smith. Large amounts also are bought by Tennessee farmers in Alabama and lesser amounts in Virginia. This is in part compensated by some movement from Tennessee dealers into Kentucky and from Memphis and Chattanooga to suburbs in adjoining States.

More fertilizer moves from North Carolina dealers into South Carolina than in the reverse direction. The Nevada fertilizer control office estimates that several hundred tons are brought into the State each year by consumers that are not accounted for in the official reports.

The New Hampshire situation may be partially explained by a considerable movement from Massachusetts dealers along the Merrimack River and from a fertilizer wholesaler in Lawrence, Mass. to New Hampshire dealers. Similarly, considerable amounts of fertilizer delivered initially to points in Canada, New York and Massachusetts are consumed in Vermont.

It is likely that some small amount of fertilizer delivered in California, Arizona and New Mexico may be finding its way into Mexico.

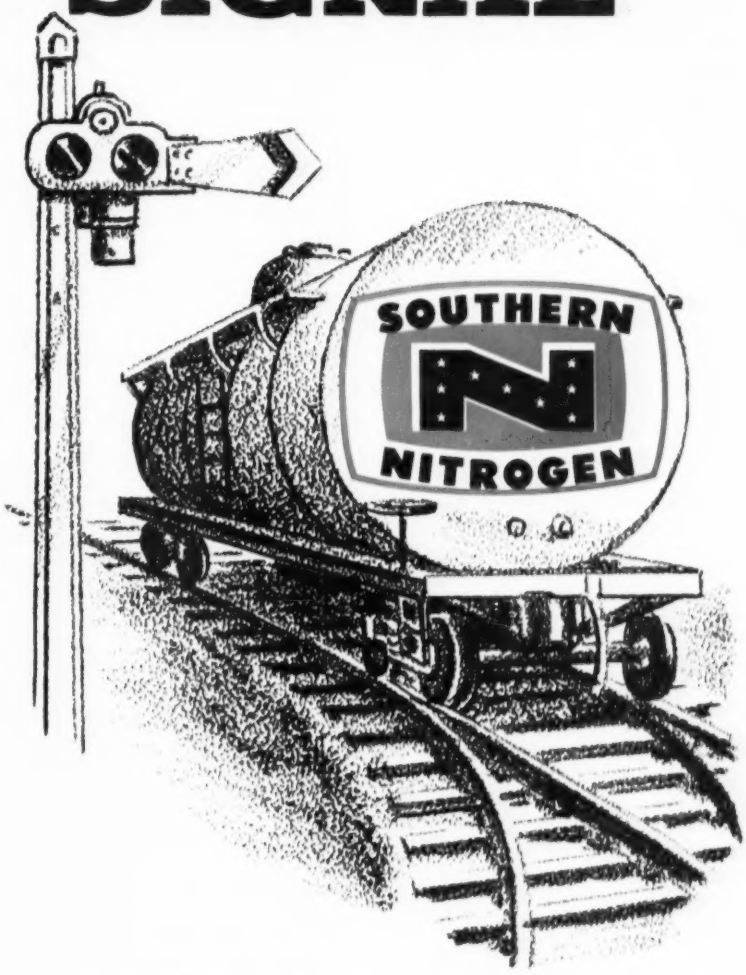
Total manufacturers' deliveries of fertilizer by counties are available for 15 States, as is comparable Census data on farm consumption. Thus, non-farm consumption by counties in these 15 States can be estimated on the same basis as State non-farm consumption.

The problems encountered in estimating non-farm use by counties are the same as for the States, but are even further complicated by local geography. Again, it seems likely that data on manufacturers' deliveries and on farm use are fairly reliable, after adjustments for comparability. No accurate adjustments for inter-county movements after initial delivery are possible, however, although some conclusions can be drawn from a study of the local situation in each case.

The difference between manufacturers' deliveries and farm consumption were determined for a large number of counties in the 15 States for which county statistics were available on a satisfactory basis. All of these States are in the Southeast, except Missouri, Kansas and New Mexico.

A study of these data in relation to the local situation indicates that as a general rule, the difference be-

SIGNAL



FOR WHAT YOU WANT
WHEN YOU WANT IT

The FULL LINE of Southern produced Nitrogen Solutions.
Ammonia • Ammonia-Ammonium Nitrate • Urea • Ammonia-Ammonium Nitrate-Urea

FAST SERVICE from 5 Railroads serving Savannah.

WEIGHING-IN of ingredients for accurate, uniform formulation.

SOUTHERN NITROGEN

May we supply your next requirements?

Southern Nitrogen Co., Inc.
P. O. Box 246 Highway 21
Phone ADams 3-3001
Savannah, Georgia

tween manufacturers' deliveries and farm consumption is approximately the non-farm consumption in counties that contain a city of over 50,000 population, located away from the county boundaries, which is not an important wholesale center.

It was found that most counties which appear to have abnormally high non-farm consumption have wholesalers who sell to dealers in other counties. Conversely, counties which appear to have abnormally low non-farm consumption generally do not have wholesalers so that retail dealers must obtain their stocks from wholesalers outside the county.

The location of important trading centers near county lines is another complicating factor as is the reported delivery of fertilizer to large consumers at one or more central locations which then is used at other locations in adjoining counties.

The widest variation in apparent non-farm fertilizer consumption rates per-capita was found to be in counties with non-farm populations in the range of 40,000 to 45,000. Of the 17 counties studied in this category, indicated per-capita rates varied from 0 to 1,170 pounds. This at first seems strange until it is realized that in this population range, the widest variety of conditions can be found that affect fertilizer use. For example, there can be no city conditions in a county where the whole urban population lives in small towns and villages. Such a county also may adjoin a large city and have a large suburban population. In other cases the only city may be near the county line and much of the apparent consumption actually used in other counties. Or, like Panama City and Key West, all the fertilizer used may be bought from wholesalers in other counties giving the impression of zero consumption.

Table VI. Effect of Community Size on Non-Farm Fertilizer Consumption

Population Range	Number of Communities in Sample[1]	Mean Per-Capita Consumption and Its Standard Error (Pounds)
Less than 5,000	4	14 ± 4.1
5,000- 9,999	3	21 ± 3.3
10,000- 19,999	2	38 ± 8.8
20,000- 29,999	19	[2]108 ± 17
30,000- 34,999	21	[2]135 ± 22
35,000- 39,999	18	[2]163 ± 36
40,000- 44,999	17	[2]201 ± 86
45,000- 49,999	9	95 ± 33
50,000- 99,999	48	66 ± 9.0
100,000-199,999	35	64 ± 12
200,000-399,999	12	41 ± 6.3
400,000-799,999	10	32 ± 7.8
800,000 and over	4	8 ± 1.4

[1] Includes all counties for which separate data is available as well as cities, towns and other urban communities included in the study. While communities included range from New England to New Mexico, the majority are in the South.

[2] Probably somewhat too high. See text.

Virtually no reliable data have been available in the past as to fertilizer consumption in cities, towns and urban communities. As a result, a sample survey was made in 14 such communities with 1950 populations ranging from 1,753 to 966,000. The communities included were selected to represent various conditions such as soil, climate, and economic status as well as size. Information was sought from both dealers and consumers. Table V summarizes this study as it relates to over-all usage in these communities.

Generally speaking, per-capita rates are lowest for the very small towns and the large cities. While small towns usually have detached houses and relatively large building lots, the number of large users such as golf courses, city parks, public buildings, college campuses, industrial plants and memorial-type cemeteries is limited.

The opposite is true of cities of from 20,000 to 50,000 population which also generally have many homes with large lawns and fine gardens. Above 50,000, the proportion of row houses and apartment buildings increases with size and the size of the average building lot decreases. In the largest cities, the average amount of land available per capita for home lawns and gardens approaches zero.

In Washington, D. C. (for which USDA statistics are available), per-

Table V. Estimated Non-Farm Fertilizer Consumption Selected Cities and Towns, 1956[1]

Community	Population[2]	Non-Farm Fertilizer Consumption	Average Plant Food Content			Fertilizer Type			Average Per Capita Consumption
			Nitrogen (N)	Available Phosphate (P_2O_5)	Potash (K_2O)	Farm Mixed	Farm Straight Materials	Specialty[3]	
		(Tons)	%	%	%	%	%	%	(Pounds)
Athens, Ga.	28,180	800	6.7	9.5	8.5	78	12	10	57
Winchester, Va.	13,841	276	5.5	9.7	5.6	89	4	7	40
Anderson, S. C.	19,770	350	5	10	7	—	—	—	35
Atlanta, Ga.	331,314	9,900	6.4	8.8	7.2	80	8	12	30
Prince Georges Co., Md.	255,644[4]	3,400	5.8	9.6	4.9	86	2	12	26
Gettysburg, Pa.	7,046	82	6.4	8.7	6.2	61	6	33	23
Franklin, Ky.	4,343	47	4.9	10.1	6.6	43	16	41	22
Enfield, N. C.	2,361	21	6.0	9.0	6.6	90	6	4	18
Dover, Del.	6,223	48	5.4	9.5	6.8	82	1	17	16
Winsted, Conn.	8,781	65	5.8	9.6	5.4	60	3	37	15
Batesville, Ind.	3,194	20	11.4	6.1	4.1	26	20	54	13
Baltimore, Md.	966,000[4]	3,000	6	10	6				6.2
Washington, D. C.	859,000[4]	2,540	7.2	8.2	3.8				5.9
Pennsboro, W. Va.	1,753	3	5.3	10.0	8.4				3.4

[1] Based on a randomized sample survey.

[2] 1950 Census.

[3] Including liquid fertilizers, bone meal, activated sewage sludge, dried animal manures, urea condensation products, processed tankage, and fertilizer recommended especially for lawns, azaleas, roses and other non-farm crops.

[4] Estimated 1956 population.

capita consumption decreased from 7.1 to 5.9 pounds from 1954 to 1956. A similar situation probably is occurring in other large cities with the trend toward suburban living. The rates in the suburbs of these cities is much higher, however, and probably is increasing.

To study more carefully the effect of size of community on non-farm fertilizer consumption, all of the counties studied as well as the cities, towns and urban communities were grouped according to size as shown in Table VI and the average per-capita rate was determined for each group. As might have been expected, the rates are lowest at each end of the Table and highest for the group with populations between 40,000 and 45,000.

While the shape of this curve probably is generally correct, there is reason to suspect that the averages in the population groupings between 20,000 and 45,000 may be on the high side. Communities with less than 20,000 population almost never contain a fertilizer wholesaler that is not a manufacturer. In communities of over 100,000 population, the presence of such wholesalers has a relatively small effect in most cases. However, in communities with between 20,000 and 50,000 population, wholesale shipments into other communities may represent a significant proportion of reported manufacturers' deliveries.

Selling Lawns sells fertilizer

We know a man who is a major factor in the frozen chicken business because his father died and left him a grossly overstocked poultry feed store. To sell the feed he sold his neighbors on raising chickens. To make this practical he had to process the result. Q.E.D.

Down in Oklahoma, according to "Today's Fertilizer Dealer," Spencer Chemical's Bill Dowell and Jack Tyler sell packaged lawns to gain a captive market for fertilizer.

But let the Spencer publication tell it:

"Bill Dowell and Jack Tyler sell grass—and lots of fertilizer to make it grow!

"In fact, whether you need a pasture or a lawn, a golf course fairway or a greener cemetery, Dowell-Tyler is equipped to do a "turn-key" job (meaning the customer doesn't have to do anything but stand back and watch the grass sprout).

"All of which shouldn't overshadow the fact that these two Oklahomans have one of the most complete soil and crop services in the Stillwater, Oklahoma area—it's just that their Bermuda Grass sprigging operation enables them to offer a unique and valuable service to their customers—and to gain a captive market for a lot of fertilizer!

"Their "grass selling" operation started about three years ago (just about the time the Dowell-Tyler partnership was formed). In the first of the drouth years, many farmers in the area, with the added attraction of ACS payments, were interested in converting sub-marginal cropland into pasture.

"The new partners were quick to sense this opportunity for a dual grass and fertilizer selling operation. They bought a sprigging machine and went to work, planting 300 acres during their first season. Business has grown since then, particularly since the Soil Bank came on the scene. This year, although rains cancelled weeks of the sprigging season, they hoped to set out 700 acres of Common Bermuda pasture.

"Here's how "Operation Pasture" works: The Common Bermuda sprigs are rooted up from sandy soil (usually in a creek or river bottom) with a field cultivator. Dowell-Tyler contracts for this ground, an acre of which will usually furnish enough sprigs for setting out about 50 acres of pasture.

"The sprigs are raked into piles for hauling to the sprigging site. There, they are loaded on the sprigging machine which plows a furrow, drops in a bunch of grass, adds a dose of mixed fertilizer (usually 150-200 pounds of 10-20-10 per acre) and covers the furrow all in one quick operation. The machine moves right along, covering up to 20 acres in a day.

"Before the spriggers arrive, the ground is prepared just as it would be for wheat. Dowell-Tyler will even do this part of the job if the customer requests it. Then, after the grass comes up, they complete the package by loading one of their big spreader trucks with ammonium nitrate and top-dressing at a rate of 250-300 pounds per acre—giving them a captive market for up to 500 pounds of mixed goods and ammonium nitrate per acre!

"Of course, the Bermuda Grass operation is only one phase of the services offered by Dowell-Tyler. Their two spreader trucks rove within a 50-mile radius of Stillwater carrying lime, mixed fertilizer and straight materials. Often, especially on pastures which have been sprigged with Bermuda Grass, they will mix certified field seed (an item which they grow and sell) with the fertilizer and overseed the ground.

"Folks in town, as well as those on the farm, know about Dowell-Tyler service. Regular advertising in the local daily, pitching fertilizer for lawns as well as for crops and pastures, has educated the townspeople to come to Dowell-Tyler for lawn advice and fertilizer. As an example, they move about six tons of ammonium nitrate each summer just for lawns.

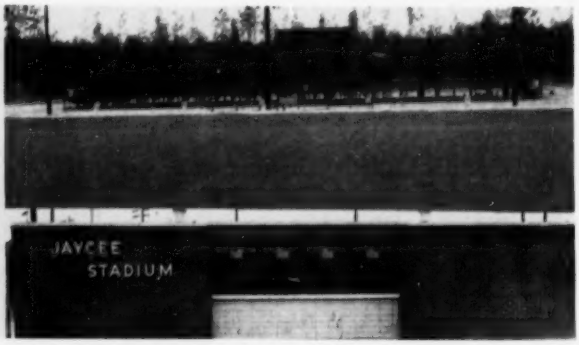
"This year they have inaugurated a lawn service which compares favorably with the pasture operation in completeness if not in size. First, they will spread mixed fertilizer on the lawn. Next, they come in with a rototiller and plow it under, rooting up the old grass. After this is done the lawn is sprigged with "Sunturf," a hybrid Bermuda developed especially for lawns. Then, after the grass is up and starts to spread, they complete the deal by top-dressing with ammonium nitrate. They will do about 40 lawns this first season. But next year they expect this complete service to really catch on.

"Do-it-yourself" lawn tenders also buy "Sunturf" from Dowell-Tyler, and it is being distributed by them in several Oklahoma cities.

"When it comes to proving the value of fertilizer on crops, Bill and Jack can furnish plenty of examples from the 605 acres of crop and pasture land which they operate. Bill likes to tell about one patch of wheatland they took over when it was averaging about 7-8 bushels per acre. Last year, with 40 pounds of N and 150 pounds of superphosphate, they got 20 bushels and this year, with the same application, they're shooting for 30—which won't

be half bad for land that's not really wheat country.

"So, it looks as if the partnership of Bill, a farmer turned dealer and Jack, who holds a degree in mechanical engineering, will be a growing and "going" concern for some time to come. Of course their "package" deals can't be used by every dealer, but their philosophy of showing the farmer what fertilizer can do and making it just as easy as possible for him to purchase it and get it on his land, is certainly a good one to follow."



Left: The area where the stadium was placed was identical to the woods shown on the left. Fence and part of the grandstand shown on the right.
Right, above: Playing field and east grandstand.

Right, below: Ticket window and entrance.

(Photos by J. Cooper Morcock, Jr., Agronomist, Southern District, Nitrogen Division, Allied Chemical & Dye Corp.)

TURF —under pressure

Can a stadium be developed after the first of the year and be ready for play when the football season opens in the Fall? The citizens of Wayne County under the leadership of the Jaycees at Jesup, Georgia, proved it can be done.

The field was graded on May 11, 1957. The entire area planted to grass is 1.11 acres. Collier Brothers, fertilizer dealers at Jesup, were given the job of having the playing field ready for use when the season opened in the Fall. W. D. Collier said the treatments were as follows:

1. ½ ton dolomitic limestone and one ton granular 4-12-12 applied over the freshly graded area on May 11. The same day Tift 57 burmuda grass was sprigged into rows spaced 18" apart.
2. On June 24, 60 lbs. nitrogen from liquid nitrogen was dribbled onto the field.
3. July 10, 60 lbs. nitrogen from liquid nitrogen was dribbled onto the field.
4. July 26, 60 lbs. nitrogen from liquid nitrogen was dribbled onto the field.
5. August 27, 60 lbs. nitrogen from liquid nitrogen was dribbled onto the field.

("Feran," the liquid ammonium nitrate product of Allied Chemical & Dye Corp.'s Nitrogen Division was the specific solution applied in each instance.)

6. September 6, 100 lbs. 5-10-15.
7. Beginning about one month after sprigging and each week thereafter the grass was mowed.

The first game was played on September 20 and at the time the pictures were made two rough games had been played on the area. Because the field is a considerable distance from high school and the sod is "new" the coach does not use it for practice purposes.

The Collier Brothers and Jaycees of Jesup prove that in the Southeast if you want a first-class football field ready when the season opens it can be had with (1) proper soil preparation, (2) planting in an adapted variety of grass (3) liberally fertilizing, and (4) mowing.

Penn. Bankers Again Distribute Leaflets

At the request of the Pennsylvania Bankers Association, the National Plant Food Institute again for the fourth year will furnish for distribution through local banks during the coming year a leaflet promoting soil fertility and advocating the use of soil testing.

The leaflet was first prepared in the Fall of 1956 by the Bankers Association in cooperation with The Pennsylvania State University College of Agriculture. It was published by National Plant Food Institute, and nearly 40,000 copies were distributed to Pennsylvania farmers through 130 cooperating banks during 1957.

The Bankers Association plans distribution of a similar quantity during 1958.

Canadians Expect Consumption To Double

Canadian consumption of agricultural chemicals is expected to double in the next six years, the annual meeting of the Canadian Agricultural Chemical Association was told.

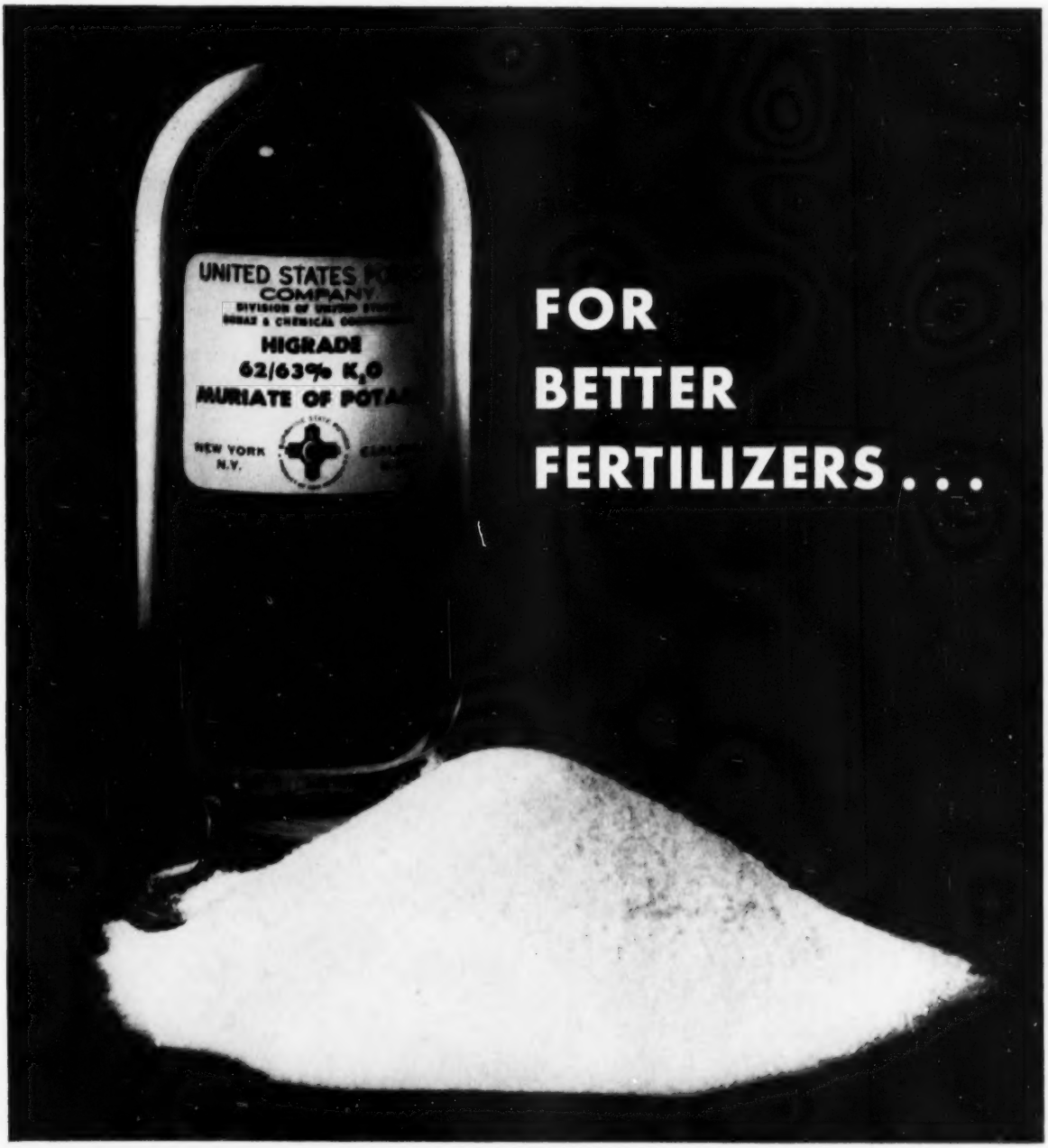
The statement was made by research manager D. K. Jackson of Monsanto (Canada) Limited in a panel discussion with J. J. Parchelo, chief of the metal and chemical products section of the Dominion Bureau of Statistics.

Total sales of agricultural chemicals last year amounted to $24,685,000 compared with $7,200,000 10 years ago.

Mr. Jackson attributed the growth in the industry to an increase in use of chemical weed killers and insecticides.

Vice chairman W. W. Buchanan of the Tariff Board, Ottawa, described how Canada's tariff structure has assisted in the establishment of the country's agricultural chemical industry.

All imported items used in the formulation and manufacture of agricultural chemicals are duty free, he said.



USP'S HIGRADE MURIATE OF POTASH

USP's Higrade muriate of potash (62/63% K_2O)—perfect for the manufacture of modern fertilizers. This superior white potash is non-caking and free-flowing throughout.

Our Technical Service Department stands ready to answer any inquiries.

USP also offers Higrade Granular muriate of potash—62/63% K_2O—and Granular muriate of potash—60% K_2O—both free-flowing and non-caking.

UNITED STATES POTASH COMPANY
DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION
50 Rockefeller Plaza, New York 20, New York
Southern Sales Office: Rhodes-Haverty Building, Atlanta, Georgia

REG. U. S. PAT. OFF.

MEMBER: AMERICAN POTASH INSTITUTE

FORMS AND PLACEMENT OF FERTILIZERS FOR

Low Cost Cotton

by G. E. Smith
Department of Soils
University of Missouri

The development of the fertilizer industry has been closely associated with cotton production on the highly leached soils of the southeastern states. Extensive fertilizer use on the more fertile alluvial lands is a comparatively recent development. It has not been too many years past that many Missouri planters considered as an insult any suggestion that fertilizers might be of benefit in cotton production. However, in the past fifteen years fertilizer use in our seven principal cotton-producing counties has increased from 6000 tons in the spring months of 1942 to 85,530 tons in the same period of 1957. The percentage nutrient content has been raised from about 20 to 35 percent. We are now using nearly forty times as much plant food as before the war. This gain has resulted from profitable returns on greatly reduced acreages. Few soils, regardless of how deep or initially productive, can supply the required nutrients for most efficient and profitable cotton yields. We are rapidly approaching the time when most cotton produced in the humid area will receive some fertilizer.

New Fertilizer Developments

There have probably been more developments in fertilizer chemistry and understanding of soil fertility and plant nutrition in the past ten years than in the previous period of development in the fertilizer industry. Most striking has been the development of new high analysis compounds. Anhydrous ammonia is now the principal source of nitrogen for direct application. Nitrogen solutions, mixed liquid fertilizers, phosphoric acid and other materials are continuing to gain in tonnage. Few of these materials were used in sufficient amounts ten years ago to rate a separate listing in fertilizer statistics. The demand for fertilizer nutrients has brought many new names to the fertilizer industry. Promotion has been vigorous. Although there may be some differences in soil reaction and plant response to various materials, these effects have been minor in the increased use of specific materials. The convenience of application and cost per pound of nutrients applied have been the deciding factor to business-minded farm managers.

A better understanding of soil fertility and the nutrition of cotton has changed concepts of fertilizer use. Application of fertilizer is changing from the application of a certain amount of mixed goods, that returned a greater value than its cost, to systems where soil fertility is removed as a factor in production. Except for the cost of fertilizer, it costs little more to bring a two bale crop to time of harvest than one that produces only 300 pounds of lint. The investment in the crop can no longer be jeopardized by an insufficient or improper balance of plant nutrients. Much attention has been recently given to the use of soil tests as a measurement of fertility balance. These tests are not perfected but is the best tool now available. It is my opinion that cotton interests should give the development of better soil tests more attention. Knowledge of the nutrition of corn and correlation with soil nutrients is much better understood.

Placement of Fertilizer Important

A large percentage of the fertilizer used in the past on cotton has been mixed goods applied in the row at time of planting. Much research work has shown that placement of this material slightly below and from 2 to 3 inches to the side of the seed will have the most desired "starter" effect. Too close placements may result in injury to the stand from soluble salts. If farther away the plants may be stunted before the roots reach the nutrients. Although fertilizer placement has received much attention from research workers, and there has been some new developments by machinery companies, by far the greatest percentage of machines now in use embody the same principle that has been in use for two or three decades. Many of these planters place the fertilizer above the seed and near the surface of the soil.

Even with the best machines available it is not possible to apply sufficient nutrients close to the row at time of planting to secure more than a starter effect. Greater amounts applied deeper are usually required for most profitable yields.

Much of the equipment now available (particularly fertilizer hoppers) were designed in a period when the amount applied per acre was small. Because of the inconvenience and need for frequent filling many of our land owners are bedding or plowing down all of their soil treatments for cotton. Our experimental work on a wide variety of soils indicates this is not efficient. Particularly in wet springs, such as 1957, was the response of cotton to band placement of starter fertilizer striking. These plants made early growth to a stand so important in our area at the northern end of the cotton belt.

It is most important to have an adequate supply of available phosphorus close to the young cotton seedling. Most of our cotton-growing soils have a high capacity to fix this element. Our results show, on most soils, that we receive a response from phosphorus until the plow layer contains about 600 pounds of P_2O_5 in an available form. The cost of such a treatment is high. But this expense can be reduced by providing concentrated bands close to the young seedlings. The concentration in these bands can provide adequate amounts of phosphorus for the young plants without competition of the soil clay by fixation.

Personally, I feel that the role of

From a talk presented before the Beltwide Cotton Mechanization Conference, October 2-4.

starter fertilizer may have been overemphasized for some soils. They are of less importance on soils where leaching is not a serious problem, where ample fertility levels are provided, or on fertile land where the soil warms rapidly. However, when seasons are wet and cold or soils are low in nutrient content these available nutrients at proper position in relation to the germinating seed can be of great benefit in securing a stand, promoting early growth and aiding in early weed control.

Farm labor for handling fertilizer is no longer as plentiful in many areas as some years past. Failure of fertilizer distributing attachments for dry materials to keep pace with other machinery developments to permit the application of the greater amounts of nutrients being used has, in a large part, been responsible for the failure to apply starter fertilizers—particularly where fields are large. This has also been a stimulus to the development of liquid materials as well as the use of fertilizer materials and bulk spreading.

New Fertilizer Materials Increasing in Use

A number of new fertilizing materials have become generally available in the past ten years that promise to replace some older materials or take over a large part of the future increase in demand. Properties of these materials that will reduce labor requirements in handling as well as cost per unit of plant food applied will be important considerations.

Anhydrous Ammonia. Anhydrous ammonia is now the principal source of nitrogen for direct application. Its increased use will probably continue since at the present time it is the cheapest source of nitrogen (applied) when used in quantities required for optimum cotton yields on most soils.

The use of anhydrous ammonia has encountered some "growing pains" that should now be past. It was extensively used before its soil chemistry was thoroughly understood. In some cases, it was used without adequate amounts of other elements, and results were not always consistent. (Soil tests can show other elements that may be needed.) In other instances, ammonia was applied when soils were too wet or too dry and soil retention was low. Our research work shows that if as much as 100 pounds of anhydrous ammonia per acre is applied in 40-inch rows that few soils can absorb the quantity at the point of release. If the ammonia is applied when soils are wet, the ammonia dissolves in the soil water, moves to the surface as the soil dries, and a considerable quantity may be lost to the air. This loss may be greatly reduced by closer knife spacing. Our field results show little difference in response of cotton to any of the forms of nitrogen when properly applied. It is suggested that knives be placed not more than 12 to 16 inches apart for preplant applications. There should be sufficient power to place the material at least 6 inches deep in the soil. Maximum efficiency can be obtained by applying when soils are at optimum moisture content.

Aqua ammonia. Aqua ammonia is anhydrous ammonia dissolved in water. It has been most popular in the irrigated areas. Our results have indicated little difference in crop response from aqua or anhydrous ammonia. It is probably not necessary to place aqua as deep in the soil as anhydrous and it can probably be used more satisfactorily when soils are very dry. Its use will probably depend on local promotion.

Nitrogen Solutions. A number of nitrogen solutions are now available for direct application. Most are corrosive to low cost metals, and require special applicators. They are cheap, and easy to handle. Solutions containing no ammonia have no pressure and may be applied to the soil the same as solids. Soil reactions will be similar to applying solid nitrogen materials to a dry soil.

The low-pressure nitrogen solutions contain some free ammonia and must be placed in the soil to prevent loss. We have obtained good results when these materials are placed only two to three inches deep.

Solid Nitrogen. A number of solid nitrogen materials are now available ranging from 16 to 45 percent N. Differences in response by cotton to the various materials have been minor. Some of our observations with urea have not agreed with theory. The lasting effect and delay in cotton maturity have been greater than our soil chemistry work would indicate. Perhaps there are other soil reactions of this material that are not yet fully understood.

Balance Nitrogen With Other Elements. Our results in fertilizing cotton indicate it is not possible to supply sufficient nitrogen before planting to obtain maximum yields. Applying the entire requirements before planting usually results in excessive vegetative growth and poor early set. If only a moderate amount is added, the supply is inadequate later in the season and yields are reduced. Side dressing may be the answer, but in our soils these later applications have not been too successful in producing maximum yields except when irrigation is available.

On most soils mineral treatments must be stepped up to balance the greater quantities of nitrogen now being used. The residual acidity from most of the forms of nitrogen calls for greater use of lime. Although cotton has a low calcium requirement, there is an increasing number of reports of failure to obtain the expected response from fertilizers because soils were too acid to obtain efficient utilization of other elements.

Recent research we have conducted points to substantial losses of nitrogen as nitrogen (N_2) or nitric oxide (N_2O) from most nitrogen

Dr. C. L. W. Swanson (left) of the Texas Company presents a check for $2,500 to Dr. W. H. Pierre of the agronomy department at Iowa State College in support of a new Texaco Fellowship in Agronomy there. The nitrogen research conducted under this fellowship will be directed by Dr. John Pesek, Jr. (center) and Dr. Lloyd Frederick.

BIG DAVE SAYS,

DAVISON

GTS*

now guarantees you a 46% A.P.A. minimum!

*Granulated Triple Superphosphate

HIGH IN P_2O_5 CONTENT—Because it is constant in analysis its guaranteed minimum is 46% A.P.A.

UNEXCELLED QUALITY—Because of Davison's more than century of experience in fertilizer formulation DAVISON Granulated Triple Superphosphate is the standard by which all other granulated products are compared. It is guaranteed to satisfy you on every count.

EASY TO HANDLE—Because of its uniform particle size it spreads evenly and uniformly and is perfect for direct applications. Does not deteriorate in handling, packaging or storage.

IDEAL FOR FORMULATIONS—Because it is easy to blend. Excellent for alkaline goods and especially recommended for O-25-25.

"TRIPLE" IN SERVICE AND DELIVERY TOO—You get DAVISON GTS *when* you want it, *where* you want it, the *way* you want it.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY

Division of W. R. Grace & Co.

Baltimore 3, Maryland

Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels, Silicofluorides, Rare Earths and Thorium. Sole Producers of DAVCO® Granulated Fertilizers.

carriers under some conditions. This does not refer to losses of ammonia as a gas or the leaching of nitrates. This work has not progressed sufficiently to know all of the factors involved, but we have found wide variation in losses from different materials on various soil types. This does not mean we should reduce or increase the rate of nitrogen application for cotton, but we believe these results may explain some failures to obtain the expected response. In the past we have believed that nitrogen use has been more efficient, but this percentage absorption is no different than planting much more cotton seed than is needed for a final stand, to be sure sufficient seedlings emerge.

Mixed Liquids Fertilizer. Tonnages of mixed liquid fertilizers are increasing. There is little difference in crop response from these materials and solid fertilizers of the same analysis. They are growing in popularity because of ease of handling and ease of placing in the desired position relative to the seed. I know of machines where sufficient liquid can be loaded on a tractor (by pump or air pressure) to apply starter fertilizer for 10 to 20 acres without refilling. This convenience and saving of labor is popular. How far these materials will expand in use will be determined by the cost of ingredients and the ability of dealers to deliver in peak seasons.

Phosphoric and Sulfuric Acids. Phosphoric acid has been inferior as a source of phosphorus when applied directly to our soils (acid soils). However, when applied with rock phosphate it has given good results as manufactured superphosphate with a substantial saving in cost. We do not have results with cotton yet, but the substitution of spent sulfuric acid (cost 72 cents per acre) with rock phosphate produced an increase in wheat yield in 1957 worth over $32.00. Here in a field where the fundamental research is completed and its use in increasing efficiency of crop production await the development of the necessary machines for application.

Bulk Spreading. The increased use of plant food per acre has stimulated the use of straight fertilizer materials for correcting fertility deficiencies or for plow-down application. This practice has probably developed more rapidly in the corn country than in the cotton belt. Spreaders with three hoppers are available that will permit the simultaneous application of three materials in any proportion. Custom truck application is expanding where the materials are blended in a central plant or where the truck will contain three hoppers and any desired ratio may be applied. In our area these methods of applying increased amounts of plant food have effected substantial savings to growers. Certainly anyone interested in the mechanization of cotton production or in the design and manufacture of machines to plant cotton and apply fertilizer should carefully consider the possibilities of these methods of application.

New Fertilizer Equipment Needed

In the cotton-growing area of the southern states, fertilizer equipment was developed to apply relatively low analysis mixed materials. In many areas this equipment may be still adequate. However, there is a need for planters that will properly place starter materials. If dry materials are to be used the size of hoppers must be greatly increased. This may require transferring the load to the tractor and devising means of conveying the material to the planter shoes. Ease of filling hoppers must be considered if dry mixed fertilizers are to continue in use on large operations with a dwindling labor supply. Perhaps some attention should be given to bulk handling of dry mixed fertilizers to save labor and bagging costs. Possibly the cotton producer might pick up a few pointers from the broiler industry or the so-called "pork factories" now receiving so much publicity.

The mixed liquid fertilizers, as well as the possibilities of reducing costs by the manufacture of available phosphate from rock phosphate and acid in the field should be studied by farm operators as well as industry, in consideration for mechanizing the cotton crop. Perhaps other tools can be adopted to apply fertilizer with some other operations and save time and costs. We have applied anhydrous ammonia with a moldboard plow or with a muddle-buster. Nitrogen solution and liquid fertilizers have been applied with attachments while discing or using a field cultivator. We have found a drag harrow equipped with hollow teeth a most satisfactory tool for applying these liquids. (It has also worked for applying anhydrous ammonia in 6-inch spacings if there is not too much trash and the soil is mellow.) Certainly there are many opportunities for improving our present methods.

This increase in fertility additions will change other mechanization practice in cotton production. Plants will probably be larger. Maturity will frequently be delayed. Late weeds may be stimulated and a more vigorous foliage will complicate insect and disease control.

With such a large percentage of our population of school age, it would appear there will be a continued demand for clothing, food, and manufactured goods that will tax our labor supply for some years.

The trend to larger farms and the elimination of small inefficient units will continue. A larger percent of our cotton production will be on larger mechanized farms. In forecasting the outlook in the fertilizer industry, I can see only a continued increase. I believe that future trends will be closely associated with methods that will permit mechanization and reduced the labor of handling the increased quantities that will be needed.

National Potash Offers Eymann Process to Industry

National Potash Company has been granted the exclusive right to authorize the use of the Eymann batch granulating process in the fertilizer industry, William B. Porterfield, vice president and sales manager of National, announces.

The process was developed by Lewis Eymann, president and co-owner of the North-Ag Chemical and Supply Company, Forest City, Iowa, to meet the competition in that area where a closely sized granulated product is a necessity. Two plants have been using this process for almost a year, and both have reported excellent results, Mr. Porterfield said. Production with one-ton mixers ranged from 12 to 20 tons per hour with grades from 3-12-12 to 5-20-20 to 10-10-10.

The principal advantage of the process, Mr. Porterfield added, is the low capital investment it requires. In most plants already producing pulverized fertilizer conversion to Eymann process can be made for under $5,000.

National Potash is offering the process as a service to the industry and the company's technical service staff will assist in its installation. Arrangements will be made with respect to patent rights for the mutual protection of all concerned. Inquiries should be addressed to National Potash Company at 205 East 42nd Street, New York 17, N. Y.

Sackett Equipment PAYS ITS OWN WAY

Sackett Builds The Equipment You Need

- **Continuous Granulating Units**
- **Plant Modernization Programs**
- **One Man Batch Weigh Systems**
- **Mixing and Shipping Equipment**

Aerating Equipment
Automatic Control Equipment
Basing Units
Belt Conveyors
Bucket Elevators
Centralized Control Systems
Continuous Acidulating Processes
Continuous Ammoniating Systems
Conveyors
Coolers
Crushers
Disintegrators
Dry-Mixing Units
Dust-Arresting Equipment
Fume Scrubbing Systems
Hoppers and Spouts
Materials Handling Equipment
Milling and Screening Units
Multiple Hopper Batching Systems
Oil Fired Dryers
Plant Mechanization Systems
Pneumatically-Operated Gravity Batch Mixers
Pneumatically-Controlled Valves
Pulverizers
Sackett Timken Bearings
Sacking Units
Scales
Screens
Shipping Units
Shuttle Belt Conveying Systems
Tailing Mills
Vacuum Condensing Systems

GET THE RIGHT ANSWER TO YOUR PRODUCTION PROBLEMS get Sackett

SACKETT

THE A. J. SACKETT & SONS CO.
1727 S. HIGHLAND AVENUE
BALTIMORE 24, MARYLAND

CFA Expects 600

Under Secretary of Agriculture True D. Morse and Dr. Russell Coleman, executive vice president of the National Plant Food Institute, were to be the featured speakers at the Thirty-fourth Annual Convention of the California Fertilizer Association, according to Jack Baker, association president. 600 men and women were expected from the United States and Canada.

This year's program was held on November 3-5 at the St. Francis Hotel, San Francisco. The addresses to be given on Monday touched upon different facets of the convention theme, "Our Partnership With Agriculture." A panel discussion on that subject will follow.

Moderated by Dr. D. G. Aldrich, Jr., chairman, Department of Soils and Plant Nutrition, University of California, Davis and Berkeley, the panel will consist of Dr. George B. Alcorn, Director of Agricultural Extension, University of California, Berkeley, representing official agriculture in the State; J. Earl Coke, vice president, Bank of America, San Francisco who will speak for crop production financing agencies; John Martin, Jr., well known Salinas grower and shipper, and a past director of Western Growers Association, on agricultural marketing problems; and Lowell W. Berry, president, The Best Fertilizers Company, and a director of the association, of Oakland, representing the fertilizer industry.

Annual reports will be heard from President Baker, Los Angeles; M. E. McCollam, of San Jose, Chairman of the Association's Soil Improvement Committee; and from General Manager Sidney H. Bierly, San Marino.

Most delegates and visitors were to bring their ladies, Mr. Baker said, for whom an enjoyable program was scheduled.

Four directors, each to serve for three years, and the 1958 association officers were elected at the business meeting, which was also to act on the proposed budget for the year 1958.

Support 4-H Clubs

Two leaders of the fertilizer industry have been conducting an industry-wide drive in behalf of 4-H club work. They are John V. Collis, president of Federal Chemical, Louisville, and R. E. Bennett, president of Farm Fertilizers, Omaha.

In July they kicked off a drive for funds and, as of October 1, 28 concerns in the industry have contributed. As their most recent follow-up letter points out, "The response from the fertilizer industry has been good, but we need more help."

4-H is a non-profit organization, educational in function, and responsible for the development of many a top-flight farmer, who has served as a model for his community. We need youngsters like that coming along. They are the leaders in mechanization, in modern application, in proper and full use of fertilizers. Q.E.D.!

Companies that have contributed as of October 1 are: Tab Grain Company, Ambia, Indiana; United States Potash Company, New York, New York; National Potash Company, New York, New York; F. S. Royster Guano Company, Norfolk, Virginia; Valliant Fertilizer Co., Laurel, Delaware; Cooperative Fertilizer Service, Inc., Raleigh, N. C.; Pinellas Growers Association, Clearwater, Fla.; Shur-Gain, Inc., Presque Isle, Maine; Cotton States Fertilizer Company, Macon, Ga.; Potash Company of America, Carlsbad, N. Mex.; U. S. Industrial Chemicals Co., New York, N. Y.; Farm Fertilizers, Inc., Omaha, Neb.; R. E. Bennett, Farm Fertilizers, Inc., Omaha, Neb.; Meridian Fertilizer Factory, Hattiesburg, Miss.; Atlantic Fertilizer Corp., Riverhead, New York; Escambia Chemical Corp., New York, N. Y.; The Cotton Producers Association, Atlanta, Ga.; National Plant Food Institute, Washington, D. C.; Kingsbury & Company, Indianapolis, Ind.; Brown Fertilizer Co., Blackville, S. C.; Virginia-Carolina Chemical Corp., Richmond, Va.; U. S. Steel Corp., Pittsburgh, Pa.; The American Agricultural Chemical Co., New York, N. Y.; The Dow Chemical Company, Midland, Mich.; Southern Nitrogen Company, Inc., Savannah, Ga.

Messrs. Collis and Bennett have asked that companies wishing to contribute make their checks payable to the National 4-H Club Foundation and mail direct to Grant A. Shrum, Executive Secretary, 4-H Builders' Council, 8561 Fenton Street, Silver Springs, Maryland.

HELP YOURSELF TO BIGGER PROFITS

PHOSPHATE PRODUCTION
No other process begins to compare with *way-ahead* Sackett SUPER FLO in making normal, fortified and triple super-phosphates of premium quality at *way lower* cost.

MIXED GOODS MANUFACTURE
Your investment in the latest Sackett Methods of producing conventional fertilizers is *guaranteed* to pay handsome returns. We are anxious to prove it.

MODERNIZATION PROGRAMS
Step ahead of competition by entrusting your fertilizer expansion and modernization facility programs to our care. Many of the most forward-thinking fertilizer producers are glad they did.

GRANULAR FERTILIZER
Sackett Equipment leads the field in Granular Production.
The names of the fertilizer companies who have selected Sackett Granulating Processes above all others, read like a "Who's Who in Industry".

NEW PLANTS
Invest your dollars wisely by having Sackett build your new plant. We do the whole job . . . from the inception stage thru building construction and equipment fabrication to operating plant. See us for guaranteed results.

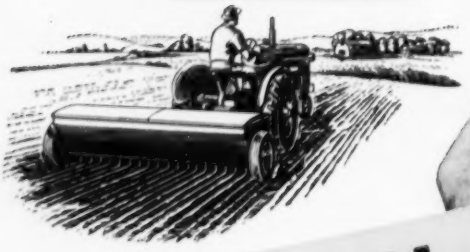
There is nothing that appeals to a man's reason more than plain facts. And, one plain fact is this . . . you can help yourself to bigger profits by resolving ***now*** to replace wasteful obsolete plant equipment with the latest rock-bottom cost methods as exemplified in Sackett Production Processes and Materials Handling Equipment. Why not start the ball rolling by writing or phoning us today?

THE A. J. SACKETT AND SONS COMPANY
SACKETT EQUIPMENT
BALTIMORE • MARYLAND
1727 S. Highland Ave.

Architects and *Manufacturing* Engineers to the Fertilizer Industry Since 1897.

America's Foremost *Creative* designers & Builders of Commercial Fertilizer and Superphosphate Plants . . . Related Production Equipment

TENNESSEE CORPORATION



GRANULAR

TRIPLE SUPERPHOSPHATE

For Direct Soil Application

As in all U. S. Phosphoric Products, Granular Triple Superphosphate is produced under the most exacting chemical and physical controls to furnish you and your customers a product of consistent uniform particle size, completely dust free with low moisture content that will not cake or lump in storage or bridge over in the hopper. It drills free to provide the desired amount of plant food through even, uniform flow and distribution.

RIGID QUALITY CONTROL
Through Six Basic Chemical and Physical Analysis

HIGH WATER SOLUBILITY
High Water Solubility is a Characteristic of all 3 Grades

RUN-OF-PILE
Fine Texture, Highest Porosity, Large Surface Area, Small Particle Size, for Maximum Ammoniation-Granulation.

GRANULAR
Dust Free, Free Flowing, Uniform Particle Size, Medium Hardness, No Bridging Over, for Direct Soil Application.

COARSE
For Intermediate Ammoniation to Produce a Semi-Granular Product. Also Affords Excellent Compatable Mixing with Granular Potash, for Minimum Segregation, in Alkaline Grades.

GUARANTEED 46% A.P.A.

Available in Bags or Bulk

There's a **BRADLEY & BAKER** office near you. Their representative would be pleased to consult with you on your requirements and to advise on your most convenient delivery routings.

U.S. PHOSPHORIC PRODUCTS
TAMPA, FLORIDA

Division TENNESSEE CORPORATION

SALES AGENT:
BRADLEY & BAKER
155 East 44th Street—New York 17, New York
DISTRICT SALES OFFICES:
Atlanta, Ga. Indianapolis, Ind. St. Louis, Mo.
Norfolk, Va.

Is Research Bringing Us a

NEW ERA

in

Agricultural Aviation?

by KENNETH MESSENGER
Plant Pest Control Division
Agricultural Research Service
United States Department of Agriculture

I will not indulge in a series of outright predictions, but rather review recent developments and current trends, looking ahead only as far as facts justify. Further, it seems appropriate to look outside as well as inside the Cotton Belt, for recent history is filled with examples that demonstrate the adaptability of machines and methods to do work other than that for which they were designed.

The tremendous growth in both air and ground equipment has been brought about by various factors:

(1) Chemicals have been developed that can be applied as liquids in concentrated form, thereby enabling applicator aircraft to operate in competition with ground equipment and in areas inaccessible to such equipment.

(2) Inexpensive used aircraft and trained pilots were abundant after World War II.

(3) Plant scientists have developed crops more attractive to pests as well as to people.

(4) Public acceptance of infested or inferior products has diminished rapidly.

(5) Scores of introduced pests—for instance pink bollworms, Mediterranean fruit flies, and gypsy moths —have demanded special attention.

(6) Crop losses formerly charged to soil deficiency or disease have been found to be due to nematodes or other pests.

(7) Selective herbicides, insecticides, and fungicides have found wide acceptance.

(8) Improved inorganic fertilizers and the demonstration of their value have rapidly increased their use.

These are but a few of the many factors that have influenced the growth of application equipment.

Currently, the acreage treated with agricultural chemicals by aircraft in the United States is equivalent to approximately one-fifth of all cultivated land.

The relatively low cost of war-surplus aircraft and converted, mass-produced types has been a deterrent to the design and manufacture of specially designed agricultural models. However, several are making their appearance, and undoubtedly within the next few years they will begin to effect a substantial replacement of less suitable types and justify their higher cost through increased safety and efficiency.

These new types will generally be capable of slower flight during operations. They will take off and land in shorter distances. They will apply either dry materials or liquids. They will offer the pilot better visibility and greatly reduce his susceptibility to injury in case of accident. They will carry a larger payload for a given horsepower rating.

With this improvement in aircraft, dispersal equipment must keep pace. Public and private research have advanced some principles that have found rather wide acceptance, and the trend toward a standardization of mechanical details is accelerating.

As an illustration, we may look at one effort to improve uniformity of distribution of granulated insecticides, a type of material of great value for some purposes and perhaps with potential in the production of cotton. Preliminary tests were made with a spreader not unlike some dust spreaders now in use. The deposit varied from 5 to 60 pounds per acre across the swath. In cooperative work between the Plant Pest Control Division, U. S. Department of Agriculture, and the Texas A & M College, this spreader was modified to give uniform distribution. The significant aspect of this illustration is that for this single purpose more than 130 test flights were made, with eight different spreader modifications, before the desired results were obtained.

An interesting example of a problem faced by equipment designers as a result of improvements in agricultural chemicals occurred not long ago in connection with the control of grasshoppers. As late as 1948 almost all grasshopper-control work was done by applying a wet, somewhat cohesive bait. It was difficult for aircraft to handle, and the swath obtained was very narrow. In 1949 a dry bran bait was first used on a large scale. This was much more suitable for aircraft application, for it flowed readily and covered a wider swath, but discharging it from the large aircraft then needed for this work presented unusual mechanical difficulties. In 1951 oil sprays came into general use. They were much more adaptable to aircraft application and gave a still wider swath than dry baits, but required an entirely different kind of dispersal equipment, and consequently a great deal of experimental work.

GRANULE SPREADER

The granule spreader mentioned by Mr. Messenger was reported on with illuminating diagrams of the pattern obtained in the October 1957 issue of "Agricultural Research," USDA bulletin.

Extracts from talk presented at the 11th Annual Beltwide Cotton Mechanization Conference, Shreveport, Louisiana, October 3.

PILOT-DANGER IN CROP DUSTING

Dr. James C. Rice, professor of pharmacology at the University Medical Center, Jackson, Miss., has confirmed the fears of aviation experts that poisons applied by airplane can be responsible for plane crashes of crop dusters.

The Mississippi Aeronautics Commission and the crop dusters themselves have recognized this danger and have cooperated in publishing a pamphlet suggesting safety precautions. Many hospitals, especially in the Delta where crop dusting is extensive, have been equipped with "kits" which make possible early detection of poison absorption by pilots.

Dr. Rice, who made his study at the request of the Mississippi State Medical Association singled out organic phosphorus compounds used on cotton as the most potentially dangerous. He advocates periodic precautionary blood tests for crop dusters and others who handle the compounds.

CALIFORNIA

California Ammonia Co., Stockton, held ground-breaking ceremonies for their $4,800,000 anhydrous ammonia plant Oct. 12 on the site adjacent to the **Best Fertilizer Co.** plant.

Construction is scheduled for completion in October, 1958.

Over 540 Central and Northern California farmers have purchased stock in the organization. The board of directors has approved with Best Fertilizer Co. a 10-year management contract for plant operation. This was announced by **Lowell W. Berry,** board chairman, and **Berneil Harlan,** California Ammonia Co. president.

Production will be 100 daily tons of anhydrous ammonia.

Jack Tielrooy will be chief consulting engineer in charge of process design. He was process design engineer for the **Brea** plant.

Julian Rodgers, vice-president in charge of production at Best will be available for design checking. He has had 17 years experience with ammonia plants. He was employed by the **Hercules Powder Co.** and **Mississippi Chemical Co.** during construction of the latter company's plant at Yazoo, Miss. He also aided in design, erection, and initial operation of the company's Memphis, Tenn. plant.

Another figure in the field will be **Leroy Thompson** of Birmingham, Ala., a consulting engineer and an aide in construction.

Company officials got the green light last week from San Joaquin County after declaring the plant will operate under specifications of the Los Angeles County Air Pollution Control Board.

The ammonia company's board consists of **Lawrence Baldwin, Lloyd A. Harnish, Adolpn Merwin, K. R. Nutting, Dave Petz, C. Martin Wilmartn, Mr. Berry, Dr. W. L. Garman, A. B. Horner, F. B. Hornibrook,** and **C. W. Peterson.**

* * *

U. S. Borax & Chemical is now completing a new open pit mine and refinery in the Mojave Desert area of Southern California which will boost total American output by 30 per cent.

Designed to be a fully mechanical operation from pit to finished product, the project represents an investment of $20,000,000 and more than two years work. When officially placed in production this month it will turn out approximately 70 percent of the free world's total supply.

More than 2,000 employees and guests from all parts of U. S. and abroad are expected to attend the opening and dedication ceremonies when the plant is formally inaugurated on November 14. **James M. Gerstley,** president of the company, and top ranking government officials will participate in the program.

* * *

Stauffer Chemical will enlarge its Richmond plant to produce 50,000 tons annually of pelletized single superphosphate, Roger W. Gunder, Stauffer vice president for Western Operations, has announied.

The new plant, to cost about $350,000, will use a unique process developed by Stauffer engineers, in cooperation with a Southwestern engineering firm, and is expected to be in production about March 15, supplying single superphosphate, in pelleted form.

Wilson & Geo. Meyer & Co., exclusive sales agents for Stauffer's three superphosphate plants on the Pacific Coast, will handle the sale of this new product.

Until the new plant is in production next March, growers will be supplied with pelletized single superphosphate from Stauffer's Vernon plant, built in 1955.

* * *

California Spray - Chemical has opened the quality control laboratory at their new Richmond fertilizer plant, under the direction of **V. J. Tihenko,** their chief control chemist.

CONNECTICUT

American Cyanamid has announced plans to expand their production facilities at Wallingford, to give about 50% more melamine and urea compounds. They are also adding a wing to the administration building.

FLORIDA

Escambia Chemical stirred up Pensacola recently when the good ship Despo sailed from there with 8,000 tons of fertilizer aboard. The port hailed a new source of shipping business. The town cheered the payrolls involved. Escambia officials were quoted as considering the shipment of special importance because it comes at an off-season period.

* * *

Foremost Fertilizer, similarly stirred Leesburg, with the figures presented at their annual meeting. These showed that Foremost—"a taxpaying cooperative" according to the local press—had quintupled its volume in 8 years . . . from 7861 tons in 1949 to 38,862 tons last year, according to president **Byron E. Herlong.**

* * *

Tower Chemical Co., headed by **Byron E. Herlong** has been organized at Clermont by a group of Central Florida businessmen. According to their announcement, they expect to do a million dollars of business in crop chemicals the first year. Capital of $200,000 was authorized and subscribed. **Ralph Roane,** an engineer experienced in the field, will be general manager and executive vice-president.

Southland Liquid Fertilizer Co. were first to begin construction in the new Industrial Park area of Boynton Beach.

INDIANA

Calumet Nitrogen Products Co. has started large-scale production of ammonia at its new plant at Hammond, **Jay H. Forrester,** president, anounced October 16.

With a capacity of 300 tons a day of anhydrous ammonia, the plant is one of the largest of its kind in the U. S., Mr. Forrester said. It uses by-product hydrogen from near-by oil refining operations.

The final stage of production began Sept. 22 with start up of the nitrogen plant and successful conversion of the raw materials into ammonia.

The ammonia plant operates in conjunction with a nitric acid plant

and an ammonium nitrate solutions plant on a 24-acre site north of the Calumet ship canal in Hammond. The three units occupy more than 132,000 square feet.

About 100 tons a day of the anhydrous ammonia is being converted into nitrogen solutions, Forrester added.

The hydrogen used by the Calumet Nitrogen plant is a product of high-octane gasoline manufacture. It is supplied to Calumet Nitrogen by pipeline from Whiting, Ind., and East Chicago, Ind., refineries.

The products of the new plant are available from **Standard Oil Company** (Indiana) and **Sinclair Chemicals, Inc.,** a subsidiary of Sinclair Refining Company, which with Standard Oil is a joint owner of Calumet Nitrogen Products Company.

MARYLAND

Wm. B. Tilghman Co. recently were the subject of a half-page newspaper advertisement by a local electrical concern in Salisbury. It was headed "Hats Off!" and the lead paragraph read as follows: "The fertilizer industry started 106 years ago in Baltimore, and for 94 of those years the Wm. B. Tilghman Company has been in business primarily to manufacture the basic plant food that has made such a tremendous difference in farm production throughout our glorious land." The advertisement recited how Mr. Tilghman came from the country to Salisbury in 1956, and how he developed the present concern, from the concern for which he began work as a boy of seventeen.

MISSISSIPPI

Mississippi Federate Cooperatives, Jackson, have selected a 36-acre site at New Albany for a $325,000 mixed fertilizer and super-phosphate plant. Construction is to begin immediately and the plant is scheduled to be in operation in the spring.

Construction contract was awarded to **Mitchell Engineering Company** of Columbus, Miss.

Production of the plant is expected to be 30,000 tons annually of mixed granular fertilizer and 20,000 tons of pelleted superphosphate.

Coastal Chemical have signed a contract with **First Mississippi Corporation** a $10,000,000 concern whose initial venture this will be. They will erect at Pascagoula a phosphoric acid concentrator which will be leased to Coastal to function as part of their $6,000,000 plant. **Owen Cooper** who is active head of parent Mississippi Chemical (which is planning a $2,000,000 addition to their $8,000,000 Yazoo City plant) and of Coastal, is also chairman of FMC.

MISSOURI

Spencer Chemical Company has dedicated its new Research Center in the suburbs of Kansas City, with a dinner addressed by Dr. Charles N. Kimball, president of **Midwest Research Institute.**

NORTH CAROLINA

Roanoke-Chowan Chemical, Ahoskie, has applied for a charter, with $100,000 capital stock to be authorized. The concern plans to manufacture and sell all kinds of crop chemicals, and handle irrigation and other farming equipment. They have leased a warehouse at 14 Catherine Street .

Incorporators are: **Vernon Raynor, Kendall Freeman, J. S. Winborne and J. D. Hales.**

OHIO

DuPont's Grasselli Chemicals department has formally opened its new North Bend $2,500,000 sulphuric acid plant, which replaces the now dismantled Lockwood plant. It is capable of producing 10 tank cars of acid daily, according to **Clark W. Davis,** Grasselli's general manager.

PENNSYLVANIA

Kapco, McKeesport have announced a new turf product called "Blue Chip." This contains organic nitrogen from their activated sludge and is a 10-5-5 fertilizer, with slow nutrient release to supply all-season plant food.

TEXAS

Southwest Fertilizer and Chemical's plant at Odessa was destroyed by fire, with a loss estimated by general manager **W. G. Nelson** as several hundred thousand dollars.

CANADA

North American Cyanamid Ltd. last month celebrated its 50th birthday with company wide ceremonies. It is one of Canada's oldest chemical concerns, having been first established in 1907 with a plant at Niagara Falls, Ontario.

FRANCE

Compagnie Francaise des Matieres Colorantes, Villers-St. Paul, dyeworks is in production with the first French commercial plant for the manufacture of maleic anhydride, intermediate in production of crop chemicals. The plant is rated at 2,200,000 annual tons.

INDIA

National Pyrites Mining Corp. is being set up by the New Delhi government to prospect for and mine sulphur-bearing pyrites. The plant they plan would have a capacity of 100 daily tons, and cost $1,500,000.

MEXICO

Sulfuros de Morelia, which is an affiliate of Houston's **Consolidated Chemical** has completed its $280,000 sulphuric acid plant at Morelia. Most of the output will go to **Celanese Mexicana,** for non-agricultural purposes.

PAKISTAN

Kobe Steel of Japan holds the contract to produce by 1961 a turnkey job on the Pakistan Industrial Corporation fertilizer plant in East Pakistan. The Japanese team to select the site has already arrived.

The East Pakistan sulphuric acid plant is in production. It is operated by the **Karnaphuli Paper Mills,** and has capacity aplenty for all domestic requirements.

* * *

ENSA of France has been signed to set up the PIDC fertilizer plant at Multan, which is to have a capacity of 1,030,000 annual tons of ammonium nitrate and 59,200 of urea.

POLAND

The Government will begin construction early next year of a plant —first in Poland—to produce sulphuric acid from their own sulphur. Completion is set for late 1959.

SPAIN

Amoniaco Espanol has applied for permit to build another nitrogenous products plant in Sevilla, this one with an output of 55,000 annual tons of sulphate of ammonia and another 55,000 of nitrates for agriculture with 20.5% of N. Except for fuel oil, all raw materials will be Spanish in origin. The previous Sevilla plant was that of **Union Espanola de Explosives and Iberica del Nitrogeno,** a billion peseta operation, permit for which was asked 18 months ago.

TUNIS

Continental Ore Co., New York, is reported interested in building a large superphosphate plant. Negotiations have been at a standstill recently, but local officials are optimistic.

Import Restrictions Cut India's Fertilizer Supplies

Agricultural production in India is likely to be adversely affected immediately by a shortage of chemical fertilizers, caused by import restrictions.

While the demand for fertilizers is rising steadily, indigenous output cannot cope with it until the capacity of the fertilizer industry is considerably expanded by the completion of new projects in the public sector.

Meanwhile the total deficit of fertilizers in 1957-58 is placed at 336,000 tons, and that in 1958-59 at more than 600,000 tons.

The total demand in 1958-59 is placed at 1,450,000 tons, while Indian production is placed at 540,000 tons and imports at 300,000 tons.

This means that less fertilizer will be available in the forthcoming financial year than now.

The effect of this shortage may be gauged from the fact that many of the Government schemes for increased crops in rice (with the Japanese method of cultivation), cotton, oilseeds, jute and sugar cane require increasingly large quantities of fertilizers for their success.

The Union Ministry of Agriculture is attempting to cover the deficit by developing the production of compost and green manures. It is officially admitted that if the shortfall is not overcome in time, agricultural production will fall seriously short of the targets for 1958-59.

Two new fertilizer projects the Government is undertaking are expected to yield 180,000 tons of fixed nitrogen and 15 tons of heavy water yearly when they are completed some time in 1960.

Work on one project, at Nangal, in the Bhakra-Nangal multi-purpose development region in Punjab, northern India, has already begun, and several large contracts for machinery have been placed with foreign firms.

This project will yield 80,000 tons of fixed nitrogen and 15 tons of heavy water, at an estimated capital cost of Rs.260 million.

The second project is still in the discussion stage. The Government proposes to locate a factory at Trombay, a coastal suburb of Bombay city, for the utilization of the waste gases from the two oil refineries there.

This factory will produce 100,000 tons of fixed nitrogen yearly, and its capital cost is estimated at Rs.300 million.

The two refineries will supply over 6 million cubic feet of gas daily. Negotiations over its selling price are going on, the Government offering Rs.3.12 a cubic feet and the oil companies demanding Rs.5.

These two plants are expected to produce fertilizer much cheaper than that produced by the State-owned plant at Sindri, in Bihar.

The cost of one ton of fixed nitrogen from Sindri is Rs.1,000. Nangal is expected to produce one ton at Rs.850 and Trombay at an even lower cost.

Georgia A E S Program: "Operation Soil Fertility"

Operation "Soil Fertility," an intensified educational campaign to increase farm income through more efficient use of lime and fertilizer, is being launched on a test basis in six south Georgia counties, according to W. A. Sutton, director of the University of Georgia Agricultural Extension Service.

Counties selected for the test program, he said, are Tift, Worth, Laurens, Coffee, Colquitt, and Thomas. Intensified work on fertilization will be made a part of the county agricultural program for those counties and will be directed by county agricultural agents with the assistance of specialists from the State Extension Service staff, representatives of the Georgia Plant Food Educational Society, and many local leaders from all walks of life.

Efforts to improve yields and, consequently, farm income in these six counties, Director Sutton pointed out, are a follow-up to the $200,000,000 soil fertility program now being promoted throughout the state. The program will be expanded into other Georgia counties as resources permit. Georgia farmers can add at least $200,000,000 to their income by using recommended fertilizer practices, Director Sutton said.

Primary objectives of the program, according to Director Sutton, are to make farmers and business leaders aware of the major role fertilizer and lime play in building a better agricultural economy in Georgia, to assist farmers in carrying out the best known fertilizer and lime practices, and to increase farm, industry and business income by sound fertilization methods.

Operation of the program will center around the theme of "Sound Fertilization Today Will Give a Better Tomorrow."

The work of the county agents in the six counties will be supervised by G. Y. Duke, district agent. Leadership for technical information will be provided by J. R. Johnson, Dr. Ralph Wehunt and Harold Gurley, Extension agronomists. Co-operating with these leaders will be other members of the Extension staff such as entomologists, horticulturists and irrigation specialists.

Some of the reasons why an intensified soil fertility program is needed in Georgia, according to Wehunt are:

1. Successful crop production depends on fertilizer and lime. Proper use of plant nutrients is responsible for a large share of the total crop production in Georgia.

2. Georgia soils are low in fertility. Results from a large number of soil analyses show that about half of Georgia's soils are deficient in potash and phosphate and 30 percent are too acid for best crop production.

3. Georgia farmers are not using enough lime and fertilizer. They could profitably double use of mixed fertilizer and eight million tons of lime are needed to bring soils to proper levels.

4. Many Georgia farmers are using the wrong kind of fertilizer. About 35 percent of the total fertilizer tonnage sold in 1956 consisted of nonrecommended, low-analysis grades. Many farmers also are using improper mixtures.

5. Average per acre yield of crops is too low. It is estimated that per acre yields, with proper fertilization, could be increased as much as 78 percent for some crops.

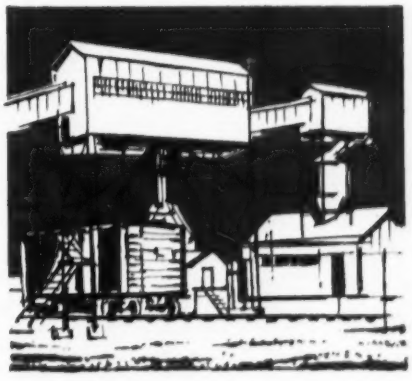
6. Fertilizer is an economical production tool. It is possible to obtain returns of from 100 to 300 percent for money spent on fertilizer and lime. Returns are sometimes so spectacular as to be almost unbelievable.

FIRST check with NATIONAL POTASH--

Manufacturers of fertilizer can depend on NATIONAL POTASH for a coarse and standard grade muriate of potash.

- DUSTLESS
- FREE-FLOWING
- UNIFORM K_2O

Ample stocks and extensive storage and shipping facilities assure you of prompt delivery of both bulk and bagged potash even during the peak fertilizer season. In addition NATIONAL POTASH offers a Free Technical Service to aid fertilizer manufacturers. *Telephone, wire or write us today.*



NATIONAL POTASH COMPANY

205 EAST 42nd ST. • NEW YORK 17, N. Y. • ORegon 9-4950

212 Bell Building • MONTGOMERY, ALA. • AMherst 5-8234

How Double-Testing Gives You Assurance That SPENSOL Meets Your Specifications:

The quality control laboratory is Spencer's "secret weapon" that makes sure you get the exact specifications you want in nitrogen solutions!

At each of Spencer's three nitrogen plants, a special quality control laboratory — completely separate from the standard production testing operation— double-checks every batch of SPENSOL.

Here, a laboratory analyst makes a series of tests on two samples taken from each batch of SPENSOL that is made. The samples are tested to see if they meet the ammonia specification, ammonium nitrate specification, and to see if the corrosion inhibitor is full strength.

Even if the two samples test out to the correct specifications, they must be almost identical in composition, or the batch cannot be shipped!

What's more, the final calculations which determine if a sample meets specifications are double-checked by another laboratory analyst for accuracy. If either man finds that the SPENSOL solution does not meet exact specifications, the plant makes the needed corrections in the formulation and the testing process starts all over again!

Quality control like this is one of the many reasons why so many mixers are switching to Spencer Nitrogen Solutions. Of course, quality control isn't the only advantage mixers get from Spencer.

For example, to help manufacturers find ways of producing higher analysis mixed fertilizer with low-cost raw materials, Spencer recently erected a mixed fertilizer demonstration unit near Pittsburg, Kansas. And Spencer's Technical Service Team is always available to help mixers trace down the cause of trouble in plant operation.

In the fields, too, you'll find Spencer working for you. Spencer agronomists are constantly promoting better farming methods, encouraging soil tests, and advising farmers to use recommended rates of mixed fertilizer.

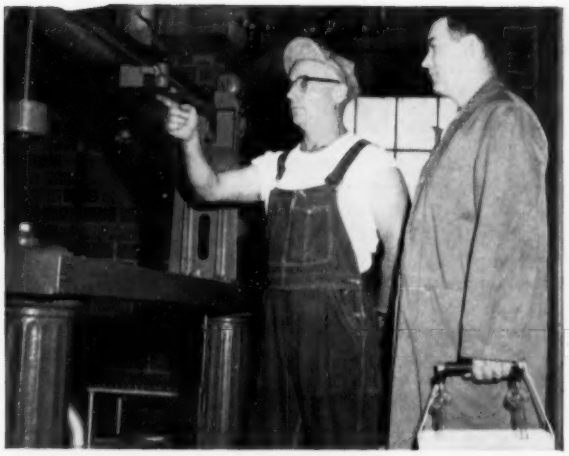
So before you place another order for nitrogen solutions, consider how much more you get when Spencer is your supplier. Switch to SPENSOL and see for yourself!

Mr. N SPENCER®

Insist on SPENSOL (Spencer Nitrogen Solutions)

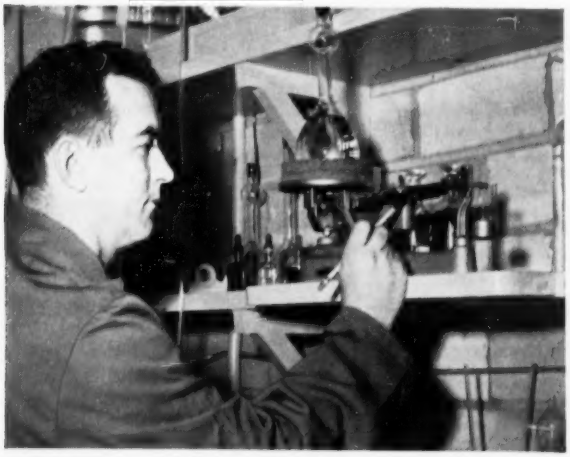
SPENCER CHEMICAL COMPANY, Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Kansas City, Mo.; Works: Pittsburg, Kans.; Chicago, Ill.; Henderson, Ky.; Vicksburg, Miss.; Orange, Tex.

America's Growing Name in Chemicals

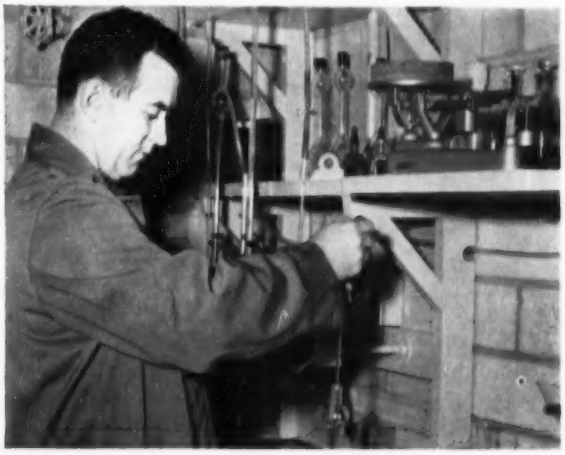


1 When a batch of SPENSOL is completed at Spencer's Jayhawk Works, laboratory analyst Carl Graham goes to the plant to take the samples needed to make tests in the quality control lab.

2 Sure that enough time has passed so that the nitrogen materials are properly mixed, Carl takes two samples of SPENSOL direct from one of the huge aluminum mixing tanks in the plant.

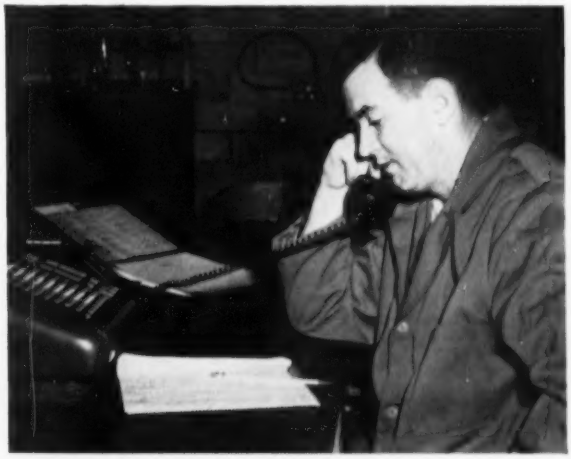


3 At the quality control laboratory, fifty yards distant from the plant, Carl takes the first step in the test: Weighing the two samples before taking a specimen of each for testing.



4 Now the actual testing begins. One of the two samples is tested to see if it contains the proper amount of ammonia. The other sample is checked for its content of ammonium nitrate.

5 After the final test, which is for strength of the corrosion inhibitor, Carl records the results. Then, he makes the final calculations which will be double-checked by another lab analyst



6 Now Carl is ready to call the plant. He advises the operator as to what changes must be made, or gives the go-ahead for shipment if the batch of SPENSOL has met all qualifications.

Dallas Cantwell, who has been appointed general sales manager of Southern Nitrogen Company, Inc., Savannah, Georgia. He will have responsibility for directing the sales of Southern Nitrogen agricultural nitrogen products throughout the Southeast. He was previously assistant general sales manager.

F. R. MacCauley, who has been appointed controller of Southern Nitrogen Company, Inc., Savannah, Georgia. Mr. MacCauley was previously assistant treasurer and assistant secretary and will continue to serve in these offices.

Union Bag-Camp Paper Corporation has appointed William T. Bess, Jr., as assistant to the president. A member of the Union organization since 1950, Mr. Bess served most recently as assistant director of multiwall bag sales.

Union Special Machine Company, Chicago, announces two new appointments in its Atlanta office: Joe Parker (left), former representative, has been appointed Special Representative, a newly created position. Taking over the territory vacated by him is Garnet H. Hamlet, who has been appointed representative. Parker's new duties as Special Representative include working with customers on new applications, special applications, follow-up on large installations and assisting representatives wherever necessary with sewing problems.

Personals

Virginia-Carolina changes: **Edwin Cox** has resigned as vice-president because of an illness which has plagued him for a year or more, but will remain as consultant. He joined them in 1920, shortly after graduation from VMI.

Amos M. Schuster, former Gulf States Paper salesmanager, has joined V-C as administrative manager. **Edward R. Adams** has been moved up from assistant treasurer to controller. **Irving D. Dawes,** who is due for retirement this year, will remain as financial vice-president and treasurer until that time.

* * *

G. Dexter Sloan, president of **Superior Fertilizer and Chemical,** Tampa, Fla., has written a 52 page booklet "The Fertilization of Citrus in Florida," which is being offered growers gratis.

* * *

J. Albert Woods, president of **Commercial Solvents** and chairman of the board of regents, University of the South at Sewannee, spoke October 18 to the Sewanee Club of Atlanta, introduced by former Georgia Governor, **Ellis Arnall** whose son is at Sewannee.

* * *

The appointment of **Dr. George R. Hawkes** as a **California Spray-Chemical Corporation** district agronomist has been announced by **Leo R. Gardner,** Calspray's manager of research and development.

Dr. Hawkes, who headquarters at Calspray's Lindsay branch office, is filling one of the new positions created by the continued expansion of Calspray's fertilizer program in the West.

* * *

International Minerals & Chemical Corporation has announced the appointment of **James Q. Stanphill** as district sales manager for the Florence, Alabama, district of the plant food division, succeeding **B. V. Bender,** who recently retired under the company's pension plan after forty-four years of service with IMC.

* * *

International Paper Company has elected **Lamar M. Fearing** and **William S. Snyder** vice presidents of the company, it was announced by **F. Henry Savage,** vice president and general sales manager. The two officers, who have served as assistant general sales managers since 1954, will continue in that capacity.

* * *

George P. Towle, formerly executive vice president and general manager of **Sturtevant Mill Company** of Dorchester, Massachusetts, has been named president of the company, succeeding **William T. Doyle,** who becomes chairman of the board of directors. **Clayton F. English,** formerly production manager, assumes the executive vice presidential post. Joseph L. Sturtevant remains treasurer of the corporation.

* * *

Dr. William Cumming Rose, noted Illinois biochemist has been selected as the 1957 recipient of the **Charles F. Spencer Award** for meritorious contribution to agricultural and food chemistry. The Award is sponsored by **Kenneth A. Spencer,** president of **Spencer Chemical Co.** and is administered by the Kansas City Section of the **American Chemical Society.**

* * *

Blaw-Knox Company announces the promotion of **Virgil J. Hostler** to Eastern district engineer of the company's chemical plants division. He

Alfred J. Dickinson who has joined Freeport Sulphur Company as vice president and sales manager succeeding the late Roy B. Johns, according to an announcement by Thomas R. Vaughan, vice president. Mr. Dickinson was vice president of Virginia-Carolina Chemical Corporation, joining them in 1939.

will be located in New York City with responsibility for division sales activities in Eastern New York, Northern New Jersey and all of New England.

• • •

The Texas Company announces that **Willard Andy Clawson** has been appointed petrochemical sales representative in Ohio and Michigan. Texaco is currently completing an anhydrous ammonia plant at its Lockport, Illinois refinery, which will produce anhydrous ammonia and nitrogen solutions for agricultural use.

• • •

Personnel changes in the sales organization of the fertilizer division of **J. R. Simplot Co.:**

A new position has been created in the sales department, that of director of market development. **C. E. Brissenden** has been named to the post. He was formerly manager of **Platte Valley Fertilizer Co.** of Scottsbluff, Nebraska, a Simplot subsidiary.

E. M. "Arkie" Cowen is the new manager of the Platte Valley operation which has a branch at Torrington, Wyoming. He was manager of the **Simplot Soilbuilders** unit at Greeley, Colorado; **Byron K. Wilson** is midwest sales representative, and

A. B. Verdery (left), northeastern district manager, plant food division of Olin Mathieson Chemical Corporation, talks over old times with Frank McQuade, his assistant. McQuade, widely known in the agricultural chemical industry, retired October 1. "It's not easy to leave," he says, "because to me work has always meant fun and friends. I've had fun at every job I've done." Included in the "fun" is an episode last February when he lay under a table in a Havana post office for three hours while revolutionist bullets buzzed over his head.

will work out of Manhatten, Kansas. **Larry Hyder** has been named Simplot West Coast sales representative to live at Placerville, California. **W. K. Jeffcoat** has been moved up to sales representative also working in the West Coast area. Mr. Jeffcoat lives at Yuma, Arizona and will work out of that city.

• • •

American Agricultural Chemical Company has announced the following organization changes in its fertilizer sales department:

J. C. Sliger, manager, Cairo, Ohio, to manager Danville, Ill.-Seymour, Ind. sales operations.

W. H. Masters, manager, Henderson, N. C., to Danville-Seymour sales.

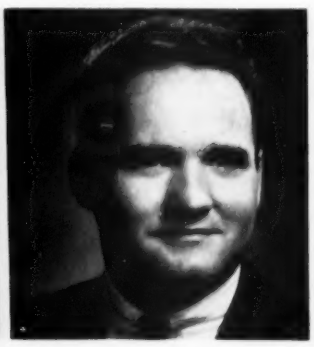
V. W. Huttemier, assistant manager, Fulton, Ill., to agronomist, Danville-Seymour.

R. P. Cagley, assistant manager, National Stock Yards, Ill., to manager, Cairo.

W. H. Phillips, assistant manager, Cincinnati, Ohio, to assistant manager, National Stock Yards.

C. E. Lowder, salesman, Baltimore, Md., to assistant manager, Washington C. H., Ohio.

W. J. White, assistant manager, Henderson, to manager.



These two men have been named supervisors in the Sales Department of Nitrogen Division, Allied Chemical & Dye Corp.: J. T. Stevens (left) who becomes district sales supervisor for the South Point, Ohio, district, and R. A. Lemler, who becomes Midwest product supervisor for direct application solutions. Stevens has been with Nitrogen Division since 1953, selling direct application and mixing materials; in his new position he will supervise both these sales operations from his district headquarters at South Point. Lemler joined Nitrogen Division in 1955 as field sales representative, and has recently been in charge of direct application solution sales in Indiana, and in his new position will supervise these sales in the Midwest, headquartering at Indianapolis.

Kendall S. Tomlinson who has been appointed sales manager for farm fertilizers by Lebanon Chemical Corp., Lebanon, Pa., Vernon S. Bishop, president, has announced. Tomlinson for three years was Northeast Area sales manager of the Nitrogen Division of Allied Chemical & Dye Corp., after having served in the Allied sales department for two years.

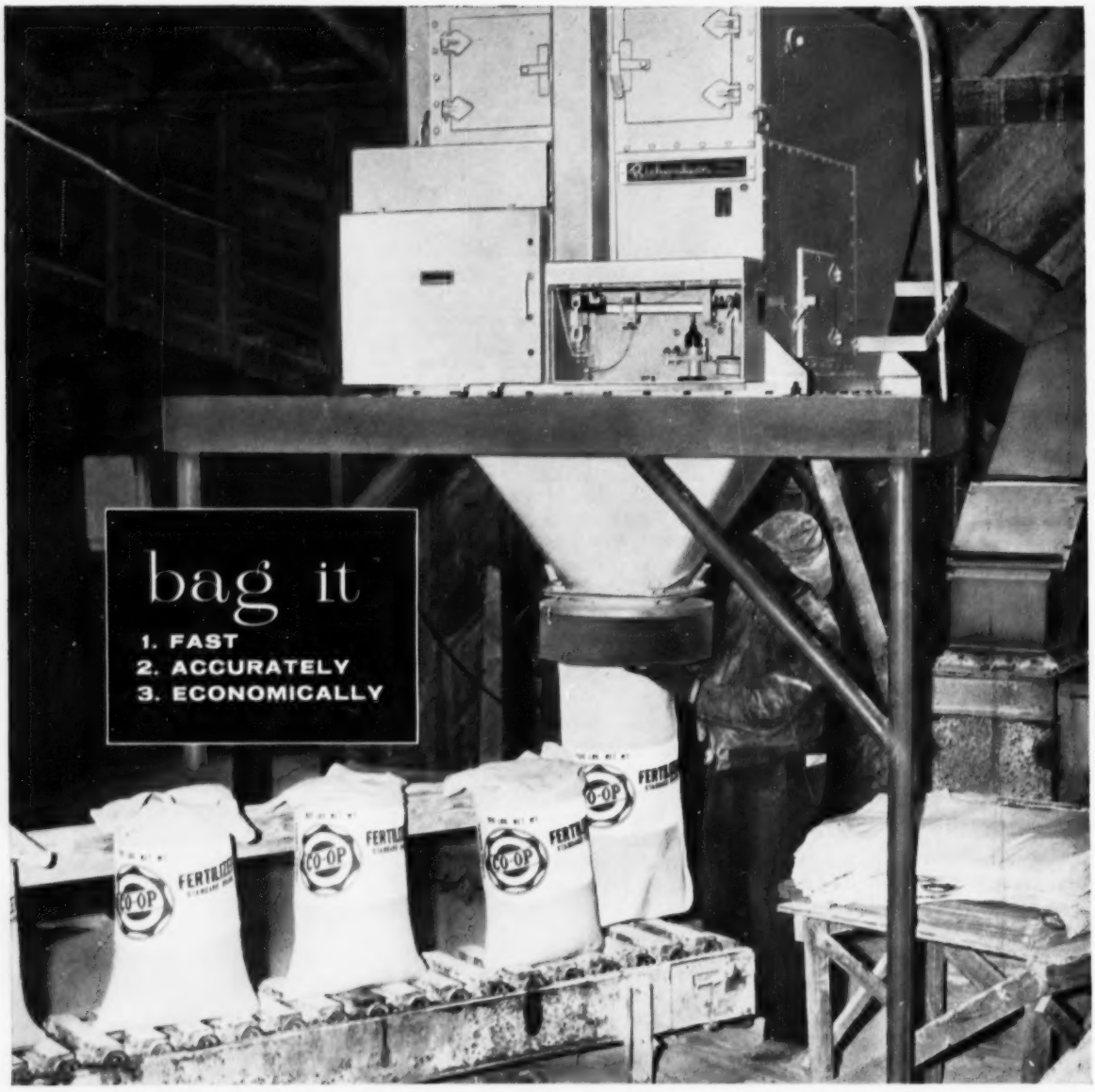
J. A. Kerr, assistant sales manager of the Bemis Bro. Bag Company's multiwall paper bag plant in Mobile, Alabama, who has been named sales service manager. He replaces G. W. Finlay who has joined the St. Louis General Office as supervisor of multiwall sales. Announcement of the appointment was made by C. E. Hayward, manager.

W. F. Turner, Jr., salesman, Carteret, N. J., to assistant manager, Buffalo, N. Y.

H. A. Finch, salesman at Pensacola, Fla., to assistant manager, Savannah, Ga.

• • •

John Chase, former general manager of **Port Fertilizer and Chemical Co.,** was elected president of the Los Fresnos, Texas, firm last month. He succeeded **Cleve H. Tandy,** who was elevated to board chairman just two weeks before his death (see Obituaries).



Richardson HA-39 Fertilizer Bagger

Any fertilizer manufacturer using a Richardson HA-39 Bagger can check off all three as well done! Richardson leads the field in all requirements for fertilizer bagging equipment. Here are some of the reasons you can look to Richardson for more efficient fertilizer production.

The Leader!

- **SPEED**—Up to twenty-four bags a minute. Capacity 50 to 125 lbs.
- **ACCURACY**—Over two million test weighings proved the Richardson HA-39 Bagger accurate to within an average of 2 ounces!
- **ECONOMY**—Saves time (high speed operation). Saves labor (fully automatic). Saves materials (prevents overweights).
- **SIMPLICITY**—Only 5 basic components, (frame, chute, feeder, beam system with hopper, bagging spout) . . . easy to operate, easy to maintain.
- **RUGGEDNESS**—Stainless—heavy gauge plate, life tested. Dust tight housing. Built for fertilizer use. Weight over 2400 lbs.

Backed by 55 years of experience in automatic weighing. For complete details ask for Product Data Sheet 5601 with complete specification list. 4557

Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY, CLIFTON, NEW JERSEY
Atlanta • Boston • Buffalo • Chicago • Cincinnati • Houston • Memphis • Minneapolis
New York • Omaha • Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal
Toronto • Havana • Mexico City • San Juan • Geneva, Switzerland • Nottingham, England

Gaither T. Newnam has been named to succeed Vernon T. Gornto (retired) at the Smith-Douglass Co., in charge of safety and industrial insurance. He will additionally serve as labor relations representative, and will headquarter at the company's home offices in Norfolk, Va. He joined Smith-Douglass in 1934 as salesman at their Danville plant, and later was promoted to assistant manager. He was subsequently production manager for their Streator, Ill., plant, and since January, 1956, has been at Plant City, Fla., as personnel manager and safety director for the Coronet Phosphate Co.

James L. App of Fairmont, Minnesota has been named Midwest agronomist for the **Virginia-Carolina Chemical Corporation** according to an announcement by **A. P. Gates,** general sales manager of the company's Fertilizer Division.

A graduate of the University of Minnesota with a degree in Agricultural Education, the new agronomist will be located in Dubuque, Iowa, and will travel extensively throughout the Midwest. He will offer technical assistance to V-C dealers and their customers. As a part of this assistance, App will conduct fertilizer meetings, promote soil testing, and work closely with other agronomists and extension men in the Midwest. In addition to his agriculture degree, he has had an extensive farm background and has been active in many farm club groups.

* * *

Hubbard-Hall Chemical Company, Waterbury, Connecticut, has announced appointment of **Professor Ralph W. Donaldson,** recently retired as extension agronomist of the University of Massachusetts after 32 years of Extension work in agricultural education, to the position of consulting agronomist of Hubbard-Hall's Agricultural Division. In this newly created post, he will work closely with farmers throughout southern New England, assisting and advising them on soil problems and proper crop fertilization practices, and will act as liaison between Hubbard-Hall and extension and agricultural education authorities throughout the northeast. He is a member of the American Society of Agronomy and was made a Fellow of the Society in 1950.

* * *

William E. Lane has joined **International Minerals & Chemical Corporation** as a sales representative for the Agricultural Department of the company's potash division. He will work in Iowa, Missouri, Minnesota, Kansas, Nebraska, Colorado and the Dakotas. Having recently completed three months of training at IMC's potash plant in Carlsbad and at other company locations, Mr. Lane succeeds **Roy Roughton,** who has been transferred to an eastern area of the division's midwestern district.

OBITUARIES

Cleve H. Tandy, 62, chairman of the board of the Port Fertilizer and Chemical Company, Los Fresnos, Texas, at his home near Brownsville on October 18.

CHANGES

The American Agricultural Chemical Company completed negotiations October 15 in the purchase of the 68-year-old **Buhner Fertilizer Company** at an undisclosed price.

The new owner has already started operations at the three Buhner plants located at Seymour, Ind., Danville and Havana, Ill. The present fertilizer plant at Seymour was built after a fire in 1929. The Danville works was opened in 1949 and the Havana plant, a warehouse for bulk and bagged fertilizer, was opened in 1955.

W. J. Turbeville, Jr., vice-president, fertilizer sales, for the A.A.C. Company, said most of the Buhner personnel have elected to join A.A.C.

With the acquisition of the Buhner plants, A.A.C. has enlarged its operation to include 31 fertilizer plants and sales offices in the United States, Canada and Cuba. In the fertilizer business for over 85 years, it has other Midwest plants at Fulton and National Stock Yards, Ill.; Cincinnati and Cairo, Ohio; and Detroit, Mich.

R. E. Lehmkuhl, formerly production superintendent at A.A.C.'s National Stock Yards, has become responsible for production at the newly acquired Danville and Seymour, plants. He will have headquarters at Danville.

R. T. Green, formerly assistant superintendent at the firm's Fulton plant, replaces Lehmkuhl at National Stock Yards.

* * *

American Potash & Chemical Corporation has opened a new district office at Columbus, Ohio, covering outlets in Ohio, eastern Indiana, southern Michigan and Kentucky.

Chester A. Lawton, who has been with AP&CC since 1950 as district representative in the midwestern area, has been appointed manager of the new district office, which is located at 12 North Third Street in Columbus.

Commercial Solvents Corporation announces the opening of a new corporate district office with headquarters at 344 Williams Street, N. W., Atlanta, Georgia, according to an announcement by **J. V. O'Leary,** general sales manager.

T. Austin Young has been appointed district manager of the new

T. Austin Young

office, which will serve Alabama, Florida, Georgia, South Carolina and North Carolina.

Sales representatives operating out of the Atlanta office for agricultural chemicals are **Clifford J. Watts, Robert Thompson, Albert W. Kinnard** and **Harold Lloyd.**

* * *

Haveg Industries, Inc. has announced the acquisition, as a wholly own-

ed subsidiary, of the **Reinhold Engineering and Plastics Co.,** Inc. of Norwalk, California, producers and fabricators of chemical corrosion equipment.

* * *

Jason M. Elsas, vice president, **Fulton Bag & Cotton Mills,** New Orleans, has announced the sale of the company's textile bag manufacturing branch in Denver, Colorado to the **Fulton-Denver Company.**

Fulton's Denver operations were confined to the manufacturing of textile bags for the Rocky Mountain Area.

Mr. Elsas emphasized while Fulton Bag & Cotton Mills has discontinued textile bag manufacturing in Denver it will continue to sell its multiwall paper bags and related items, as well as its mill products throughout the Rocky Mountain area. **W. M. Ritchie,** Denver, will represent the Company specializing in the sale of multiwall bags and other products.

* * *

Nott Manufacturing Co. confirmed they have acquired control of **Rose Manufacturing Co.,** Beacon, New York, manufacturers of the "Tri-Ogen" line of Rose Sprays and Rose Food.

Nott President **Bob Harkins** stated that the acquisition of Rose was part of Nott's general expansion program to offer its distributors a full and complete line of nationally established brands of Insecticides, Fungicides, Herbicides, Specialty Fertilizers, Rodenticides and related allied products.

Herb Harkins, who has been actively associated with the Nott organization, has been elected president of Rose. Present Beacon plant will continue to serve Rose customers without interruption.

Richardson Scale Company has announced the creation of a new regional office to serve the Eastern area, and the appointment of H. E. Kennison as Eastern regional manager. He will have responsibility for the New England, New York, New Jersey and Philadelphia District Offices including Export, with headquarters at 668 Van Houten Ave., Clifton.

* * *

The Chantland Manufacturing Company announce they are now in production at their new plant in Humboldt, Iowa, having completed the move from the former location at Badger.

* * *

Davidson-Kennedy Associates Company, designers and constructors of chemical process plants, have announced appointment of **A. T. Sieron** as project manager and **Oliver J. Bolduc** as chief process engineer.

Mr. Sieron has extensive experience in chemical plant design, construction, operation, management, chemical control, and maintenance, and was formerly plant manager for **Columbia Malting Co.** In his new assignment as project manager, he will also act as consultant on special plant layout problems.

Mr. Bolduc was formerly associated with Chemical Plants Division of **Blaw-Knox Company,** where he handled project engineering for the design and construction of complete chemical plants.

Potash Institute Reports On European Forest Fertilization

Fertilizing forest trees to speed up wood production and improve timber resources may have a bright future in America, if forest fertilization research now under way in Europe is any barometer.

This is the opinion of Dr. E. T. York of the American Potash Institute, who recently toured European research centers of forest tree nutrition to study their methods and results firsthand.

The 10-nation tour—of West Germany, France, Switzerland, Austria, Denmark, Sweden, Holland, Belgium, England and Scotland—revealed several areas where the use of fertilizer is becoming standard practice in forestry under certain conditions.

Although in its infancy and on a more limited scale than European work, recent U. S. research indicates that under certain conditions American forest trees, like agricultural crops, will respond to fertilizers. The Institute now supports forest fertilization research in New York and Florida, with other work planned.

Europe was chosen for the study because its forest lands receive intensive management and its researchers and practical foresters have studied forest tree nutrition for many years.

Since World War II, interest in forest tree fertilization has risen in Europe as a means of speeding up timber resources severely reduced by the war. And many countries now conduct "excellent research programs in forest tree nutrition."

Observing conditions under which best fertilizer responses occur, Dr. York was impressed by some of the problems which research must answer before forest fertilization can be broadly applied.

Among them was the problem of determining specific nutrient needs of different tree species growing under widely different environmental conditions.

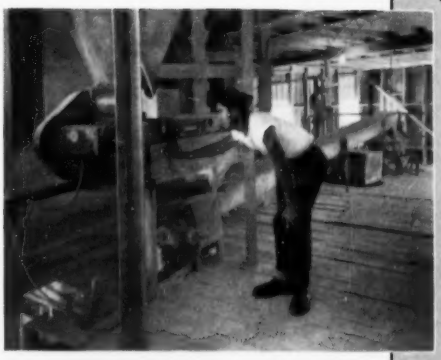
"Although soil tests will help," he emphasized, "foliar analyses now seem the best way to determine the nutrient status and needs of growing trees. In fact, nutrient levels in both soils and foliage must be carefully correlated with the response of trees to fertilizers. We must find not only the ratio, forms and amounts of nutrients needed, but also how best that fertilizer can be added."

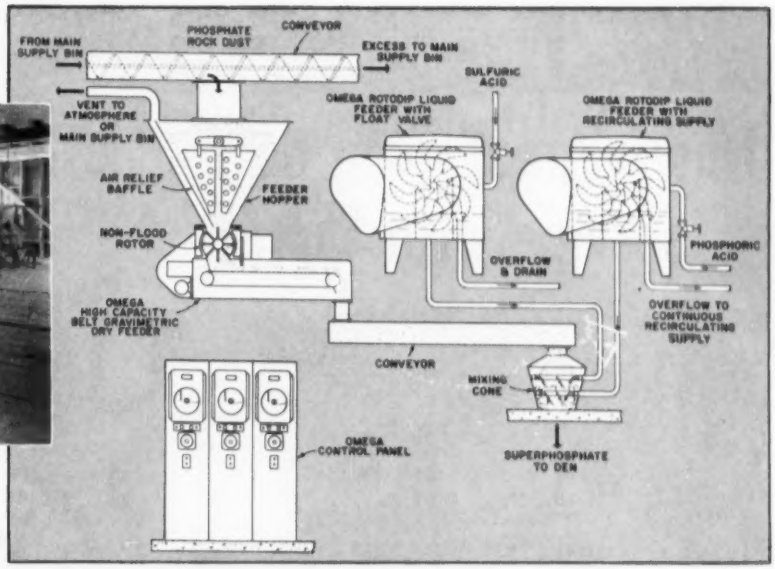
"The problem of placing the fertilizer so the plants can utilize it most efficiently is a big one," he explained. "In new plantings or young stands, fertilizer not properly used may stimulate the competition from weeds or undesirable tree species."

Limitations in the use of mechanized application equipment in established forest areas also present difficulties.

Finally, long-term economics—the long-term nature of an investment in fertilizers used in forestry-emphasize the need for careful economic evaluation of the returns from such work, York pointed out.

The Institute will issue a booklet on the new field of forest fertilization based on its European study and the latest findings on the subject.





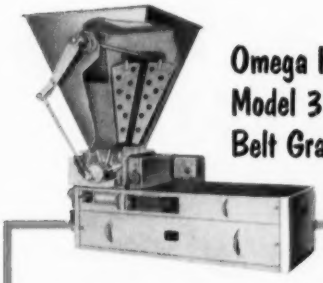
If you are using the new quick curing method for superphosphate production . . . use

OMEGA FEEDERS

- **To control flooding even with the finest rock dust . . .**
- **To feed corrosive acids . . .**
- **To gain full 100:1 feed range with top accuracy!**

The newly developed process which cuts curing time of superphosphate from several weeks to one hour calls for the use of rock dust (as fine as 95% through 200 mesh). The Omega Hi-Weigh Feeder with built-in air relief and positive non-flood Rotolock is field-proven for this duty.

The process also calls for feeding highly corrosive acids. Omega's self-cleaning, accurate, and trouble-free Rotodip Feeder is ideally suited for this service.



Omega Hi-Weigh® Model 37-20 Belt Gravimetric Feeder.

HIGH CAPACITY — feed rates up to 40 tons per hour. (Higher with materials which are not floodable.)

ACCURACY — plus or minus 1% by weight within range.

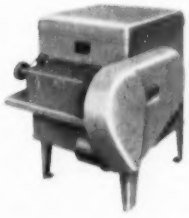
WIDE RANGE — provided by 100:1 variable speed transmission.

CONTROLLER — simple mechanical controller actuated by built-in scales. No electronic or pneumatic parts.

RUGGED CONSTRUCTION — contact areas of stainless steel with balance of feeder ruggedly constructed to assure long service in fertilizer plants.

RAPID RATE SETTING — easily achieves desired operating conditions.

EASY OPERATION & MAINTENANCE — no technical training necessary.



Omega Rotodip Liquid Feeder

— of durable, simple design accurately feeds diluted or concentrated acids, alkalies, or slurries. Request Bulletin 65-H128.

Get the facts . . .

— on the outstanding Hi-Weigh Feeder for processing ROCK DUST. Write for Bulletin 35-N62. **Omega Machine Co., 538 Harris Ave., Providence 1, R. I.**

OMEGA MACHINE CO.
DIVISION OF
B-I-F INDUSTRIES
METERS
FEEDERS
CONTROLS

Now expect even better service with **UAL**

At Du Pont's Belle Works, Belle, W. Va., spheres like these are used for storage of UAL solutions. A continuing modernization and expansion program at Belle will further increase production and quality.

Du Pont continues modernization and expands facilities for **URAMON**®

AMMONIA LIQUORS

Now Du Pont offers you even more dependable service with "Uramon" Ammonia Liquors. The extensive modernization program at Belle Works includes both expanded production facilities and a stepped-up research program.

Du Pont has been manufacturing urea-ammonia solutions for use in fertilizers since 1931. From this matchless background of broad experience come UAL products of outstanding dependability. For technical help and information on the "Uramon" Ammonia Liquors best suited to your mixing operations, write Du Pont.

HERE ARE OTHER IMPORTANT ADVANTAGES OF DU PONT URAMON® AMMONIA LIQUORS:

- High-quality nitrogen from UAL resists leaching . . . supplies both urea and ammonium forms of nitrogen.
- Safe in granulation . . . no danger of flash fires and less stack. Gives firm, uniform, stable granules, best for storage and application.
- Suitable for either batch or continuous mixing.
- Gives mixed goods better "feel"—minimizes caking, segregation and dusting.
- Won't corrode regular fertilizer manufacturing equipment, including ordinary steel and aluminum.

DU PONT
REG. U.S. PAT. OFF.
URAMON®
AMMONIA LIQUORS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. DU PONT DE NEMOURS & CO. (INC.)
Polychemicals Department • Wilmington 98, Delaware
1616 Walnut St. Philadelphia 3, Pa.
7250 N. Cicero Ave. Chicago 30, Ill.
Du Pont Company of Canada (1956) Limited
85 Eglinton Avenue East, Toronto 12, Ontario

Control Officials Program Draws Record Crowd

Attendance at the eleventh annual meeting of the Association of American Fertilizer Control Officials edged past the 1956 mark to set an all-time high of 163. The convention, held October 18 at Washington, D.C. tallied 83 state control officers, 54 fertilizer industry members, 15 federal government representatives and 11 press members.

The one-day program was highlighted by a variety of talks from outstanding men in and close to the fertilizer industry, plus reports of the various AAFCO committees. On the preceding evening, National Plant Food Institute had entertained the officials with its customary hospitality hour and banquet, and the Association's important State Relations Committee had held its regular open-forum discussion under the guidance of Chairman **M. B. Rowe** of Virginia.

The forenoon session opened with the report of perennial Secretary-Treasurer **Bruce Cloaninger** of South Carolina, then heard an especially good message from retiring AAFCO President **J. D. Patterson** of Oregon:

Outlining the the difficulty of selecting a specific topic for presentation to a national group, the president said that no matter how well informed a man may be about his own problems, he is in a poor position to speak on the subject as it affects all parts of the country.

Confining his remarks to major facets of fertilizer control work as they relate to the Pacific Northwest —especially his own state—he stated that the area had encountered no controversial problems this year except for the oxide vs. elemental guarantee. He commended the Officials' special committee on fertilizer guarantees on the manner in which it set forth the Association's stand, and expressed satisfaction that the stand was "on the side of progress."

Then Mr. Patterson tackled some other subjects of nationwide concern:

"A new problem which is beginning to be discussed concerns the place in agriculture of hormone type growth promoters. Although they are growth stimulators, they are not a source of plant food as commonly understood. Neither can they be considered in the field of pesticides. I realize that existing fertilizer laws, in many cases, can be 'stretched' to include such products. Personally, I do not like enforcement which depends on 'stretch' and it is for that reason that I believe it will be necessary for some type of new legislation to properly define their position in our control work.

"Our association should be prepared to take a uniform stand when the need for control arises. To consider this problem, I have appointed a committee to represent our association in discussion with other interested groups.

"What are we doing to meet . . . new developments? For example, in my state our experiment station is increasingly showing the need for the so-called secondary or trace elements in our soil economy. To meet this need for control I am increasingly turning my attention to the developing of laboratory methods which will not only measure these elements but will also be practical in use. In addition to our basic checking for NPK, it appears certain to me that, in future years, the control officer will of necessity need to routinely check these additional elements if we are to render the service expected of us. This will call for an increase in laboratory work. In order that this can be done as efficiently as possible, our chemists are now examining various methods of analysis with the overall goal of establishing laboratory procedures which will give results and volume of work comparable to those achieved in the NPK control work . . . One approach, dear to the heart of a bureaucrat, is to enlarge his staff and buy more equipment. Undoubtedly some increase will be needed but is this the final answer? In Oregon, we are studying the problem from a different approach.

" . . . Analytical findings of fertilizers of many companies over a period of years will show that the overall picture is not bad, that is, the manufacturer is meeting his guarantees. Here and there, however, the analysis varies and if it is low, we report a deficiency and if it is high, nothing is said. On a percentage basis these variations, in many cases at least, are rather constant. That is, they are found year after year, and are both high and low. From such a record I believe we can safely conclude that the errors are not deliberate. This conclusion, of course, is no defense for their occurrence . . .

"Improvement, in this case, can have more than one meaning. To the control official, it is less deficiencies, but to the manufacturer it can mean two things: less deficiencies as well as overages. Along this line I was pleased to note that the National Plant Food Institute has selected our friend Dr. Sauchelli to head up a program aimed at locating the cause of these variables. I feel that this study is very timely, coming as it does when many charges are being made in the industry. Although the Institute's program is aimed at correction of overages, if I read right, the ultimate findings will apply equally well to deficiencies.

"One of the first variables to be considered by the Institute's program involves sampling. Sampling studies in various fields, including fertilizers, have been carried on for years. Without detracting from this present program in any way, I would like to comment that enforcement experience leads me to concur in many ways with the report submitted to AOAC last year on feed sampling. The report by Bruce Poundstone had this to say and I quote, "That the practice of combining cores from several bags to get a 'representative' and 'true' sample be questioned. This prac-

Retiring AAFCO President J. D. Patterson (right) of Oregon receives honorary plaque from immediate past president, M. P. Etheredge of Mississippi. (COMMERCIAL FERTILIZER staff photo.)

tice has resulted in a blending of differences that may have existed between bag" (end of quote). Although Mr. Poundstone's conclusions were based on foods, I believe that a similar relationship may exist in mixed fertilizers. If such is the case, I suggest that it will be necessary to look for other causes of discrepancies rather than devising sampling ways to minimize the variations.

"Stating it another way, do the deviations found represent errors of sampling and analysis by the control office or are they the result of some other factor? In many cases I am inclined to favor an explanation based on other factors.

"For example, during the past year my office was requested by a fertilizer mixer to help in identifying several fertilizer materials of similar appearance whose identity became questionable after they had been placed in bulk storage. This material was to be used in preparing mixes. We have noticed cases where a mix-up occurred in assembling fertilizing materials to form the mixed fertilizer. We have observed composting of mixes where segregation of ingredients was obvious. Careless weighing or poorly maintained scales may be found. Poorly maintained storage bins having a leaky common wall have allowed fertilizer materials to become inter-mixed. Piles of fertilizer material resulting from dust collectors used during the mixing of dry materials are apparently overlooked by some plants in their mix calculations.

" . . . Instead of increasing our NPK work, it is our plan to increase our work to include other fertilizer elements and thus keep abreast of the findings of our experiment stations. We believe this will give us a more balanced program. Further, that by encouraging better plant management, choice of ingredients, repair or improvement of equipment, to mention a few items, we will bring about more improvement in our NPK work than by increasing the number of our analyses for these materials . . . . correction of questionable plant conditions are beyond the legal scope of our fertilizer law or the inspector's duties. However, in my state we don't follow the cop and robber approach in our enforcement work. When the opportunity presents itself our field man discusses these plant problems with the fertilizer mixer."

Paul T. Truitt, executive vice president of National Plant Food Institute, called on the control officials for assistance in improving one of the industry's most valuable working tools: state fertilizer consumption statistics.

The expanded program of direct assistance to the industry, recently undertaken by the Institute, he explained, has pointed up the necessity for more accurate merchandising. Manufacturers must have the right quantity of the right grade at the right place when it is needed. Plant turnover must be improved and carryover reduced, Mr. Truitt emphasized, especially in a market when supply is outrunning demand and prices are tending downward. Accurate consumption data will aid with this problem.

According to NPFI's information, nine states collect and report consumption statistics monthly, seven quarterly, and 21 semi-annually. Additionally, 44 states report on an annual basis; 24 of these report on the calendar year, 22 on a fiscal year, and two report on both. Also, he pointed out, there are great differences among the various states in the information collected and reported.

Mr. Truitt asked the officials to assign a committee to work toward a uniform—and improved—report procedure. What is really needed, he repeated, is a monthly report of grades and materials by counties; but he emphasized that the industry is not asking for that, at least not now. His formal request was for "consumption figures by materials and by grades on a more uniform basis from all the states and, at least semi-annually," and he pledged the Institute to work with and support any group AAFCO might assign to this task.

Sigurd Anderson, commissioner of the Federal Trade Commission, told the audience that we live in an era of exaggerated claims, a day of getting everything cheap, fast and without effort. So advertising makes its pitch to these wants. Many claims are extravagant and ridiculous, but they sell the product, because each generation has to learn the hard way. FTC's job is to check misleading advertising in interstate commerce, and it favors a heavy penalty for repeated offense in unsubstantiated advertising claims. He commended the fertilizer industry as a whole, though, and blamed most offenses on fly-by-nights appealing to the home gardener—who apparently will buy anything that promises him a "green thumb."

Dr. Paul C. Marth, USDA senior physiologist at Beltsville, spoke next, on plant hormones and growth stimulants, using numerous slide projections to illustrate experimental work done recently on the development and fruiting of different plant varieties to which these materials had been applied.

"Commercial Aspects of Minor Elements in Fertilizer" was the topic presented to the group by **Dr. R. P. Thomas,** technical service supervisor of International Minerals & Chemical Corporation's Plant Food Division, who was the only commercially employed fertilizer industry representative to appear on the control officials' program this year.

"Physical and Chemical Characteristics of Commercial Nitrogen Solutions for Fertilizer Use" was the subject detailed by **Dr. J. Richard Adams,** acting head of USDA's Fertilizer Supplies and Consumption Trends Section. Dr. Adams furnished the audience with individual copies of charts grouping the various commercial solutions by content and performance characteristics, then told how these solutions—long used for ammoniation of superphosphate and as an inexpensive form of nitrogen for mixed goods—and their new variations were coming into prominence as direct application materials. While some are formulated for a specific purpose, he

New Officers, Executive Committee for Control Officials

President: J. J. Taylor, Tallahassee, Florida
Vice President: F. W. Quackenbush, Lafayette, Indiana
Secretary-Treasurer: B. D. Cloaninger, Clemson, S. C.

EXECUTIVE COMMITTEE

Chairman: Stacy B. Randle, New Brunswick, N. J.
E. A. Epps, Jr., Baton Rouge, Louisiana
Charles Marshall, Ottawa, Ontario, Canada
R. C. Wetherell, Bozeman, Montana
J. D. Patterson, Salem, Oregon

Officers and Members of AAFCO Executive Committee at convention: (left to right) R. C. Wetherell, Montana; J. D. Patterson, Oregon; E. A. Epps, Jr., Louisiana; F. W. Quackenbush, Indiana; Chairman Stacy B. Randle, New Jersey; and Bruce D. Cloaninger, South Carolina. (COMMERCIAL FERTILIZER staff photo.)

pointed out, many are used in both ways.

As of August 1, Dr. Adams stated, there were 53 nitrogen solutions being manufactured by 22 different producers in the U. S. and Canada. Fifteen of these are non-ammoniacal solutions formulated specifically for direct application; the other solutions, containing neutralizing ammonia, are generally used for ammoniation of other fertilizer materials. However, he pointed out, solutions of the latter type which have gauge pressures of zero at 60° F. or above, and salting-out temperatures below those encountered during storage, have been used satisfactorily for direct application to the soil.

Reporting at the afternoon session for the Control Officials' Committee on Publications and tonnage reports, **Henry DeSalvo** of Arkansas summed up a survey of the state offices in which 43 responded. Thirty four of these states require a listing of fertilizer materials and grades sold, by tons, while six require a report only of the tonnage sold. Thirteen of the 43 states require invoices for each shipment, with nine specifying that they must be submitted within five days after sale.

Forty of the responding states distribute tonnage reports to registrants and other interested persons. Most are on an annual or semi-annual basis, but eight reported that they compile monthly and six quarterly. With few exceptions, tonnage information is derived from inspection affidavits and/or invoices.

Thirteen states replied that they distribute grade breakdowns by counties.

A suggested order of stating grades and materials in published reports was sent out with the questionnaire forms to each state for comments. Thirty four of the responding states felt this sequence could be used with or without modification; eighteen stated they could begin using the standard procedure as early as 1958.

The committee's report concluded that "the method of compiling fertilizer consumption tonnage reports is one area where uniformity may be attained without the necessity of changing existing laws or regulations. If this can be done throughout the country, industry and researchers will be better served and the consumer will benefit ultimately."

Later in the afternoon session, the Committee on Special Fertilizer Guarantees, chairmanned by **F. W. Quackenbush** of Indiana, reported:

"The revision of the uniform fertilizer bill which provided enabling legislation for the change from oxide to elemental guarantees for phosphorus and potassium drew mixed responses from interested parties Certain members of the fertilizer industry denounced it strongly while others praised it. The executive committee of the NPFI resolved against it. Responses of State fertilizer control officials to a questionnaire revealed a 'wait and see' attitude. Only two states (Iowa and Delaware) introduced the bill for legislative action. In Iowa, the elemental guarantee provisions were stricken from the bill before passage. In Delaware the legislature failed to take action. Industry had opposed both bills . . .

"Results of the questionnaire sent to control officials indicated that state agricultural directors and commissioners were informed about the nature of the proposed change and that experiment station and extension agronomists were generally interested and willing to work toward it. Nearly half of those replying felt that the industry was not well informed on the facts concerning the subject. Relatively few state control officials were taking the initiative to induce the change; many felt that the agronomists should take the initiative. Nearly all states reported that the change would require legislative action . . .

"On August 14th a suggestion was circulated by Dr. B. L. Tisdale for the Grades and Ratios Subcommittee of the Soil Science Society of America that consideration be given to the labeling of fertilizers in terms of ratios and total units, without any mention of grades. Comments of various members of our committee indicated that this system would not be fully satisfactory."

After completion of reports from major committees and election of a new slate of officers (see page 58), the control officials closed their meeting.

ANNOUNCEMENT

Official Publication No. 11 issued by the Association of American Fertilizer Control Officials will be available for distribution at $2.00 per copy (discounts in lots of 100 or more) December 15, 1957, through the office of Secretary-Treasurer, B. D. Cloaninger, P. O. Drawer 392, Clemson, South Carolina.

The publication includes official definitions of all fertilizer terms, grouped by principal plant food ingredients, names, addresses and telephone numbers of all Fertilizer Control Officials, and papers of those who appeared on the program.

Send check or money order to the Secretary-Treasurer, P. O. Drawer 392, Clemson, South Carolina, with complete mailing instructions. Money will be promptly refunded if not satisfied with the publication.

Chemical Control Problems Topic of NPFI Conference

National Plant Food Institute sponsored a Conference on Chemical Control Problems October 17 at Washington, D. C.—carefully sandwiched in between the conventions of the Association of Official Agricultural Chemists and the Association of American Fertilizer Control Officials.

Chairmanned by Vincent Sauchelli, NPFI's chemical technologist, the session boasted a broad range of topics within the scope of its subject, handled by speakers who could present authoriative information on each.

The program attracted more than two dozen control chemists, and an excellent turnout of fertilizer industry men and materials and suppliers.

American Chemical Society's Editorial Director Walter J. Murphy led off the morning lineup with a talk on the chemical analyst in today's industry. Robert P. Thornton of Thornton Laboratories followed with a description of Florida Agricultural Research Institute's chemical control project.

M. D. Sanders, director of research for the Plant Food Division of Swift & Co., told how the control chemist is the "key man in modern fertilizer production," and H. L. Marshall of Olin Mathieson Chemical Co. wound up the forenoon session with a report on the collaborative study on triple superphosphate for NPFI's Chemical Control Committee.

After lunch, Sam F. Thornton of F. S. Royster Guano Co., discussed the Magruder sample work, and Carrol H. Perrin, research chemist for Canada Packers Limited, spoke on the need for standard samples of phosphate, potash and nitrogen.

"Relationship of the Chemical Control Office to the Local Fertilizer Industry" was the topic of A. S. Carter, Indiana director of Seed Control and State Chemist Services. The farmer must get what he pays for when he buys fertilizer, Mr. Carter said, and nothing must be allowed to shake his confidence in the fertilizer mixer or his product. If a farmer questions your fertilizer, urge him to send a sample to the state control office, he advised, and closed his message with this caution: when you employ a fertilizer salesman, be sure he's a good public relations man.

International Minerals & Chemical Corporation's J. R. Archer followed with some sound comments on triple superphosphate analysis, then J. A. Smith of Sohio Chemical Co., detailed a rapid method for determining urea in ammonia solutions.

E. D. Schall of the Indiana State Chemist Office reviewed nitrate-chloride and tetraphenyl boron methods for a finale on the specific agenda. After his talk came a discussion period for miscellaneous items and questions before adjournment of the meeting.

'Round Table' Participants Announced

Industry men who will participate in the annual Fertilizer Industry Round Table, sponsored this year by National Plant Food Institute at the Sheraton Park Hotel in Washington, D. C. November 6-8, have been announced by Round Table Chairman Vincent Sauchelli as follows:

V. Sauchelli (Chairman), National Plant Food Institute, Washington, D. C.

G. F. Terman, Tennessee Valley Authority, Wilson Dam, Ala.

H. H. Tucker, Sohio Chemical Co., Lima, Ohio.

C. E. Floyd, Virginia-Carolina Chemical Co., Richmond, Va.

W. L. Hill, Agric. Res. Service, USDA, Beltsville, Md.

J. O. Hardesty, Agric. Res. Service, USDA, Beltsville, Md.

R. D. Tayloe, National Potash Co., New York, N. Y.

T. J. Bosman, Federal Chemical Co., Nashville, Tenn.

J. G. MacArthur, Spencer Chemical Co., Pittsburg, Kans.

A. M. Smith, Olin Mathieson Chemical Co., Little Rock, Ark.

A. Spillman, Fertilizer Manufacturing Coop., Inc., Baltimore, Md.

W. F. Jacobi, Union Bag-Camp Paper Corp., New York, N. Y.

R. W. Lahey, Jr., Bemis Bro. Bag Co., Norfolk, Va.

F. T. Nielsson, International Minerals & Chem. Corp., Chicago, Ill.

J. C. Sharp, Spencer Chemical Co., Kansas City, Mo.

A. V. Slack, Tennessee Valley Authority, Wilson Dam, Ala.

R. C. Smith, Eastern States Farmers' Exch., W. Springfield, Mass.

T. E. Martin, U. S. Industrial Chemicals Co., Tuscola, Ill.

T. P. Hignett, Tennessee Valley Authority, Wilson Dam, Ala.

R. E. Sorensen, Cornland Plant Foods, Grinnell, Iowa.

J. Seymour, Monsanto Chemical Co., Monsanto, Ill.

K. G. Clark, Agric. Res. Service, USDA, Beltsville, Md.

C. E. Waters, Allied Chemical & Dye Corp., Nit. Div., Hopewell, Va.

B. R. A. MacDonald, Potash Co. of America, Carlsbad, N. M.

L. Hein, Olin Mathieson Chemical Corp., Joliet, Ill.

D. C. Kieffer, Smith-Douglass Co., Norfolk, Va.

B. E. Adams, Allied Chemical & Dye Corp., Nit. Div., Hopewell, Va.

R. Powell, Miss. River Chemical Corp., St. Louis, Mo.

G. L. Bridger, Davison Chemical Co., Div. W. R. Grace & Co., Baltimore, Md.

E. C. Perrine, Allied Chemical & Dye Corp., New York, N. Y.

V. A. Pardo, The Foxboro Co., Foxboro, Mass.

D. Chapman, International Minerals & Chem. Corp., Chicago, Ill.

O. F. Jensen, E. I. du Pont de Nemours & Co., Maple City, Mich.

E. I. Lentz, Western Phosphates, Inc., Garfield, Utah.

W. G. Mautner, Baugh Chemical Co., Baltimore, Md.

J. R. Myers, Eastern States Farmers' Exch., W. Springfield, Mass.

J. E. Reynolds, Davison Chemical Co., Div. W. R. Grace & Co., Baltimore, Md.

W. Sackett, A. J. Sackett & Sons Co., Baltimore, Md.

T. I. Horzella, Link-Belt Co., Chicago, Ill.

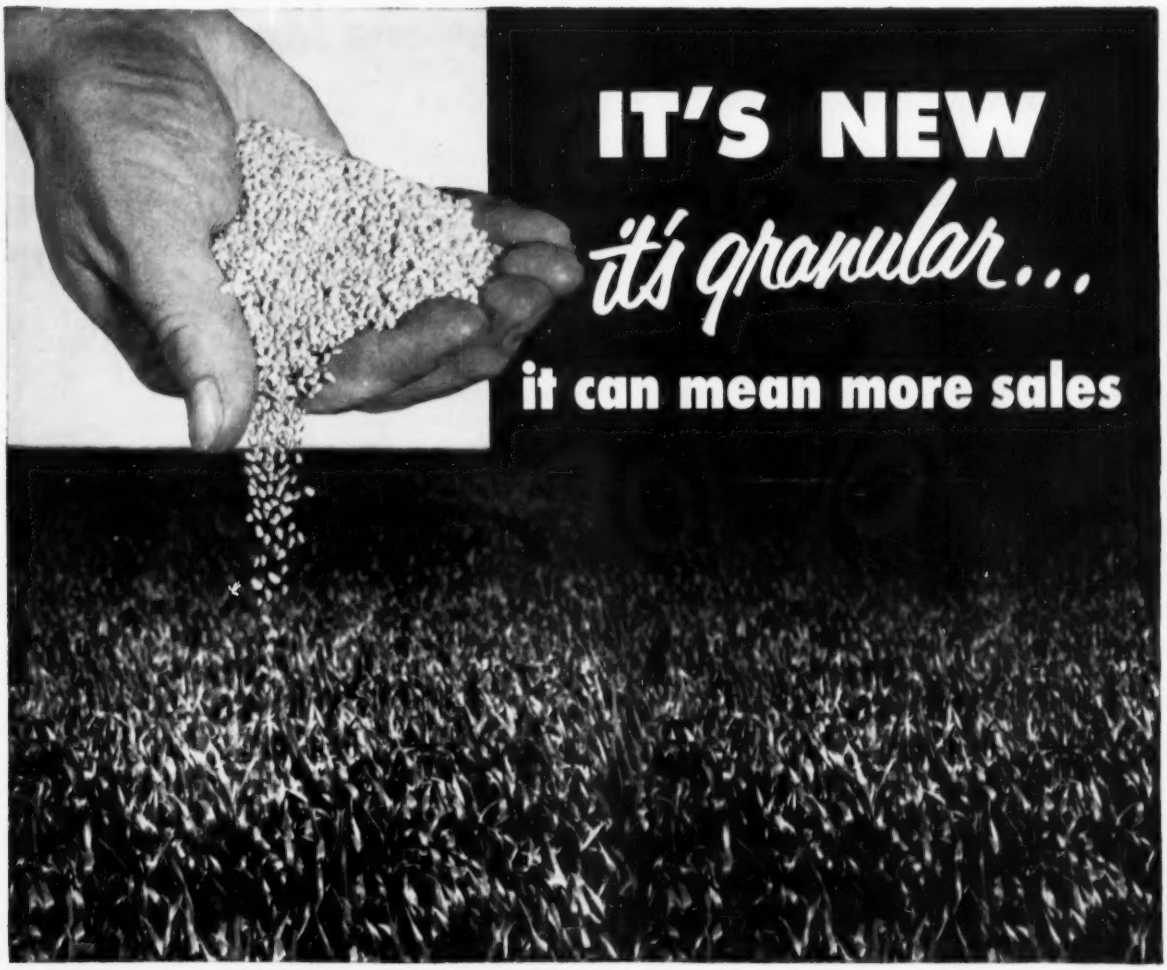
A. E. Henderson, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.

T. R. Schmalz, F. S. Royster Guano Co., Indianapolis, Ind.

H. L. Marshall, Olin Mathieson Chemical Corp., Baltimore, Md.

R. R. Hull, Pennsalt Chemicals Corp., Philadelphia, Pa.

U. S. Jones, Olin Mathieson Chemical Corp., Little Rock, Ark.



THE NEW GRANULAR Ammonium Sulfate from USS can mean more fertilizer sales for you and your dealers. This versatile nitrogen source (21% nitrogen) also supplies 24% sulfur so necessary in some areas. Whether used in mixing, in custom blending or as a straight application, USS granular Ammonium Sulfate is your best buy.

Free-flowing. Due to its granular consistency, USS Ammonium Sulfate will be appreciated by everyone who handles it, from the mixer to the farmer. Its free-flowing and non-caking nature makes it ideal for use in custom blending with other ingredients, mixing or direct application. The farmer who applies this new form of nitrogen will appreciate the smooth way it flows through a regular lime spreader or grain drill. When applied with a bulk truck, USS Ammonium Sulfate is again ideal because of its granular free-flowing form and even spreading qualities.

Tell your customers about this handy new form of Ammonium Sulfate from USS, and get in on this growing business of direct application and custom blending. Don't miss a single sale; order a supply of USS Ammonium Sulfate today.

USS Ammonium Sulfate

USS

UNITED STATES STEEL

National Fertilizer Solutions Meeting

at Cincinnati November 17-19

Plans have been completed for the annual convention of National Fertilizer Solutions Association to be held November 17-19 at Netherland Hilton Hotel in Cincinnati, Ohio.

Dean R. Gidney, vice president and general manager of United States Potash Co., is scheduled to speak as a member of a panel on "Material Supply Outlook," covering the subject of potash.

Discussing the materials outlook for nitrogen on this same panel will be H. H. Tucker, director of Agricultural and Technical Service, Sohio Chemical Co.

The third member of the panel, to speak on the outlook for phosphoric acid, will be W. R. Bone, manager of Agricultural Technical Service for Monsanto Chemical Co.

The panel discussion on "Additives to Fertilizer Solutions," promises to be a highlight. Robert W. Ellsworth, U. S. Liquid Fertilizer Co., Indianapolis, is moderator for the panel. Dr. E. J. Haertl, Agricultural Development Department of Dow Chemical Co., will speak on "The Use of Chelate Compounds in Fertilizer."

"The chemical industry in recent years," Dr. Haertl states, "has developed some synthetic chelating agents that exhibit certain properties making them superior to natural chelate compounds. They have the ability to withstand the bacterial decomposition in soil which is the fate of many organic compounds." With the recognition of the importance of chelation in natural processes, the use of synthetic chelating agents in fertilizers, particularly the soluble and liquid types, is expected to become a significant factor in future developments.

C. A. Hamsher, supervisor of Agricultural Chemicals Technical Service, General Chemical Division of Allied Chemical & Dye Corp., is a member of the panel to discuss "Various Pesticides in Fertilizers." The general types of pesticides (herbicides, insecticides, fungicides) will be pointed out with emphasis on

---

NATIONAL FERTILIZER SOLUTIONS ASSOCIATION
1957 CONVENTION PROGRAM
November 17-19
Netherland Hilton Hotel, Cincinnati, Ohio

Sunday, November 17

9:00 a.m.
General Session on Standards, Chairman Roy F. Broyhill presiding
2:00 p.m.
Board of Directors Meeting
6:00 p.m.
Suppliers Conference Rooms Open

Monday, November 18

9:30 a.m.
Opening General Session, Vice President Don Foster presiding
Welcome to Cincinnati, by Mayor Charles P .Taft
President's Address, E. E. Crouse
Report of Activities Committee, W. Harold Schelm, chairman
Report of Nominating Committee, Robert B. Ellsworth, chairman
Election of Directors
11:00 a.m.
Coffee Break
A Giant Sleeps, Minita Wescott
A Fistful of Future in Selling, Ralph Everett, Empire Sales Training Center
2:00 p.m.
Suppliers Conference Rooms Open
6:00 p.m.
New Board of Directors—Dinner Meeting
7:00 p.m.
Suppliers Conference Rooms Open

Tuesday, November 19

9:30 a.m.
General Session, President E. E. Crouse presiding
Report of Standards Committee, Roy F. Broyhill, chairman
MATERIAL SUPPLY OUTLOOK:
Panel Discussion, E. E. Crouse, moderator
Nitrogen, H. H. Tucker, Sohio Chemical Co.
Phosphoric Acid, W. R. Bone, Monsanto Chemical Co.
Potash, Dean Gidney, United States Potash Co.
Discussion Period
11:00 a.m.
Coffee Break
Successful Educational Meetings, Howard R. Lathrope, Nitrogen Division, Allied Chemical & Dye Corp.
Discussion Period
2:00 p.m.
General Session, Convention Chairman Ernest M. Harper, presiding
ESSENTIALS TO SUCCESS:
Successful Business Management, Dr. John K. Pfahl, Dept. of Business Administration, Ohio State Univ.
Selling a Fertility Program, Dr. Gordon Ryder, Extension Agronomist, Ohio State Univ.
Marketing Fertilizers, Dr. John W. Sharp, Grain Marketing & Farm Supply, Ohio State Univ.
Question and Answer Period
ADDITIVES TO FERTILIZER SOLUTIONS:
Panel Discussion, Robert B. Ellsworth, moderator
Various Pesticides in Fertilizer, C. A. Hamsher, General Chemical Division, Allied Chemical & Dye Corp.
Chelate Applications, Dr. E. J. Haertl, Dow Chemical Co.
Gibberellic Acid, Dr. Edwin F. Alder, Lilly Research Laboratories
Discussion Period
4:00 p.m.
Suppliers Conference Rooms Open
6:00 p.m.
Dutch Treat Cocktail Party
7:00 p.m.
Annual Dinner, President E. E. Crouse presiding
Introduction of New Officers, E. E. Crouse
A Country Editor Spreads It On, Mack Sauer, Leesburg, Ohio
9:00 p.m.
Suppliers Conference Rooms Open

PHOSPHATIC ACID SOLUTION FROM NEW PLANT CUTS COST OF MAKING FERTILIZERS

Many fertilizer manufacturers can now cut their costs by formulating with Phosphatic Fertilizer Solution (wet-process phosphoric acid). Use of this chemical from U.S.I.'s new plant will, in many cases, enable you to produce standard or special granular formulas at lower cost. It will also allow you to make higher analysis grades of fertilizer. To help you determine if and how you can profit by using phosphoric, the U.S.I. Technical Service Engineers are ready to work with you.

And you can be assured of a steady supply of this basic fertilizer material . . . because the entire production of Phosphatic Fertilizer Solution at the new U.S.I. plant at Tuscola, Illinois, is available for non-captive commercial uses. This amounts to 30,000 tons of P_2O_5 per year.

You can, in fact, get *all* of the following fertilizer basics in addition to PFS on *short notice locally* from U.S.I. Anhydrous and Aqua Ammonia . . . Ammonium Nitrate . . . Nitrogen Solutions . . . Sulfuric Acid . . . and Nitric Acid.

CALL IN THE U.S.I. MAN NOW

May we suggest that you get in touch with your U.S.I. man. Let him work out optimum formulations with you. He's experienced in determining the factors that make up formula cost. He will also be glad to assist you during your trial runs.

If your costs can be lowered by using PFS (and they probably can) he'll be able to help you find out. Quickly. Reliably.

If you would like the U.S.I. man to work with you, write to us—or better still telephone collect.

HEAVY CHEMICAL SALES

U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers and Chemical Corporation

99 Park Avenue, New York 16, N. Y.

those that could possibly be used with fertilizers. The limiting factors in applying pesticide-fertilizer combinations will be discussed, and mention will be made of currently used pesticide-fertilizer combinations and possible future combinations that may develop.

"Gibberellic Acid" is another of three subjects, to be discussed by Dr. Edwin F. Alder, plant physiologist of Lilly Research Laboratories.

A panel discussion on "Essentials to Success" will feature three faculty members of Ohio State University.

Dr. John W. Sharp, Grain Marketing and Farm Supply, will cover "Marketing Fertilizers," emphasizing four points: knowing your products; analyzing your demand; organizing a sales program; and getting acquainted with customer's needs.

"Successful Business Management" will be presented by Dr. John Pfahl, Department of Business Administration, pointing up the use of accounting data, sources and costs of capital for expansion, cost of credit and credit management, and profits and overhead.

Dr. Gordon Ryder, Extension Agronomist, will talk on: soil tests as a basis for starting a fertility program; is there a difference in selling a fertility program on high and low fertility soil; and factors involved in placing a complete liquid fertilizer. He will cover the subject of "Selling a Fertility Program."

"A Fistful of Future in Selling" is the title of the presentation to be made by Ralph Everett of Empire Sales Training Center, conducting sales clinics all across the United States. His message brings the audience a dynamic, hard-hitting sales presentation.

A new type of calculator that has been designed by the Phosphates and Nitrogen Division of American Cyanamid Company as an aid in determining quantities of phosphatic materials to be added when formulating various grades of mixed fertilizers. The calculator is being distributed by the division's field personnel, and also can be obtained by fertilizer manufacturers on request to the Phosphates Department, American Cyanamid Company, New York 20, N. Y.

Random NOTES & QUOTES

Olin-Mathieson's John O. Logan talked to the National Industrial Conference Board's 5th annual marketing conference recently, and he predicted a 5% dollar sales rise for chemicals and allied products in 1958. The year 1957, he told them, is expected to hit $25,000,000,000—continuing the steady rise which has been going on since 1937—with only 2 exceptions, 1949 and 1952.

O

Does witchweed come from fertilizer? A man in North Carolina says his fields are infested with it, but only where the fertilizer distributor has been. He found this on new ground, cleared less than 2 years ago, where no witchweed had been until the distributor went to work on it.

O

Stretchable paper is being developed by West Virginia Pulp & Paper Co. They have a deal with Cluett, Peabody, because somehow the Sanforizing process is involved. They foresee bags that will not break because they will stretch instead. We will forego the crack about Cluett, Peabody should make collars of the stuff so ours won't choke us any more!

O

A stick of fertilizer is now being made on the West Coast, which is simply pushed into a hole in the ground, feeding plant roots directly. It is designed primarily for shrubs and trees.

O

Battelle Memorial Institute, which knows a lot about a great many things is quoted as saying electricity will bring a virtual electrical revolution in our system of agriculture. Your first reaction, like ours, will be that it already has. But they say the average farm worker uses only 2500 KW a year, while the industrial worker consumes 20,000. They have a long list of the things that will help narrow the spread between the two.

For example:

* Mobile generators and electrically driven equipment in the field.
* Tractor-mounted, electrically powered insect and weed-killing devices.
* Extensive use of electrically powered air conditioning equipment in barns and poultry houses to provide optimum conditions for animals.
* Extensive electric lighting of field crops to influence plant maturation.
* Use of external electrical forces to alter growth of plants.
* Treatment of seeds with low-frequency electrical discharges to speed up seed germination.
* Electromagnetic radiation to replace smudge pot frost-prevention and cultivation of the soil.
* Electric motors to replace piston engines for such tasks as preparation and cultivation of the soil.
* "Nearly automatic" poultry plants, featuring conveyor belts to fill feed hoppers, move eggs to a storage room, and remove droppings.
* Computers to assist the farmer in the management of his farm operation.

O

From London comes word that Imperial Chemical Industries has completed a report on Gibberellic Acid which fills 35 quarto pages. Their Akers Research Laboratories were the first to take the "crazy chemical" seriously when it turned up in Japan.

O

Experiments with gibberellin suggest future extension of agriculture into the far north, according to a speaker at the Canadian Agricultural Chemical Assn., because it may permit germination in those cold areas.

O

Successful Farming magazine has published a guide for salesmen calling on farmers which is called "The Do's and Dont's of Farm Canvassing." The best of these, as we see it, is the one that says don't take for granted the farmer understands your trade lingo. Free copies of this guide, which sounds like good sense to us, can be had from Don Ross, Successful Farming Magazine, Des Moines 3, Iowa.

O

Dropping seeds one at a time, or a few at a time, a new Norweigan sower sounds like the answer to a farmer's prayer. And after you have seeded, a simple conversion makes it a fertilizer spreader.

Are you getting your share of the profitable NITROFORM® MARKET?

ONLY NITROFORM CAN SUPPLY A TRUE UF (urea-form)

that guarantees an A-I greater than 40

Look at the Turf Market — *over 14 million acres*

LAWNS 850,000 acres	**GOLF COURSES** 250,000 acres	**HIGHWAYS** 1,000,000 acres
INSTITUTIONS 100,000 acres		**ATHLETIC FIELDS** 150,000 acres
PARKS 225,000 acres	**CEMETERIES** 500,000 acres	**AIRPORTS** over 1,000,000 acres

Plus — *The Greenhouse, Nursery and Special Crops Market*

There is a tremendous profitable market today for mixed fertilizers containing "all-blue" 38%-N NITROFORM . . . and with good reason. For wherever good turf is desired, good feeding with a minimum of cost and labor is important.

Look at the advantages of adding "Blue Chip" NITROFORM to your mixed fertilizer products.

- **Saves repeated feedings because one application supplies vital, slowly released nitrogen all season. This cuts maintenance, storage, shipping and handling costs.**
- **Nitroform mixes easily, is clean, non-leaching, non-burning, non-toxic.**

We would be pleased to help you make up a formula with "Blue Chip" Nitroform best suited to your needs. Just drop us a line.

NITROFORM
AGRICULTURAL CHEMICALS, INC.

92 Sunnyside Avenue • Woonsocket, Rhode Island

Pacific's Sun Valley Meet

Frank Taylor, Oregon-Washington Fertilizer Co., Seattle, was elected president of the Pacific Northwest Plant Food Association at the annual convention held at Sun Valley, Idaho, October 3-5. Ray Whitcomb, Link Distributing Co., Grandview, Washington, was elected vice president; Henning Waltersdorph, Magnolia Fertilizer Co., Seattle, was re-elected treasurer, and Leon S. Jackson, Portland, re-elected secretary.

Members of the board, including the officers, who will serve the coming year are: Karl Baur, Pacific Supply Cooperative, Portland; Frank Meeker, Meeker Fertilizer Co., Salem; Norman Hibbert, The Anaconda Co., Yakima, all of whom were re-elected to the board of directors. New members of the board elected were M. V. Wolfkill, Shur-Crop Corp., Monroe, Wash.; Warren Marshall, Shell Chemical Co., Yakima; Elwood Lentz, Western Phosphates, Inc., Garfield, Utah, and Trevor Steele, American Potash & Chemical Corp., Salem, Oregon.

Constitution and by-laws of the Association were amended to increase the board membership to 11, of whom three are to represent the potash, nitrogen and phosphate industries. Members of these industries attending the convention selected their own members to the board.

The Association voted to give three $100 scholarships on a permanent basis—one each to Oregon State College, Washington State College and the University of Idaho.

Robert L. Stier, Shell Chemical Co., Boise, Idaho, was approved as a member from industry to the Soil Improvement Committee of the Association.

Attendance at the Convention was the largest in the history of the Association with 225 manufacturers, jobbers and distributors, and some of the wives present.

Salesmanship

is education in action

by B. R. Bertramson,* *Chairman*
Department of Agronomy
Washington State College

Every decision we make is built on facts or fiction which we gain through experiences or the transmission of ideas from other people. In our daily associations, we are constantly selling our ideas. In debate or in business, our success depends largely upon the facts we have and how well we present them. In other words, our success depends upon how well we educate our audience to the facts we have to present.

In the "good old days" just after World War II, all one had to do to sell fertilizer was to have an order book and a fighting chance to get some materials. In response to the terrific and growing demand for fertilizer, the industry increased production until now the supply is ample. Now-a-days the farmer is going to buy where he can get the best service and best technical information, the best education, along with the fertilizer he buys. To be a successful fertilizer dealer or salesman, you must know your merchandise and be able to educate your potential customer by answering these questions forthrightly: **1.** What can the farmer do with my product? **2.** How will it make **him** a profit? **3.** Will it serve his needs as well as, or better than, any other product he can buy?

The farmer wants to know what, when, where, and how your product will help him produce more, better, cheaper, and easier. All this information must go with your product. It's all part of the parcel you sell to the farmer. In passing this information along to the farmer, you become a part of the information, or education team. The team members are: The Experiment Stations and USDA Research Scientists who originate the information, the Extension Specialists, County Agents, fertilizer dealers, salesmen, and fieldmen who pass this information on to the farmer who puts it to work upon the land.

Putting the information to work is a big job. Experiment Station and USDA Scientists dig out the facts and publish them in technical journals. Then follows the process of rewriting, popularizing, and personalizing the information. The Extension Specialist converts it into a more digestible form. County agents, salesmen, dealers, and fieldmen interpret the facts as needed for the local farmers.

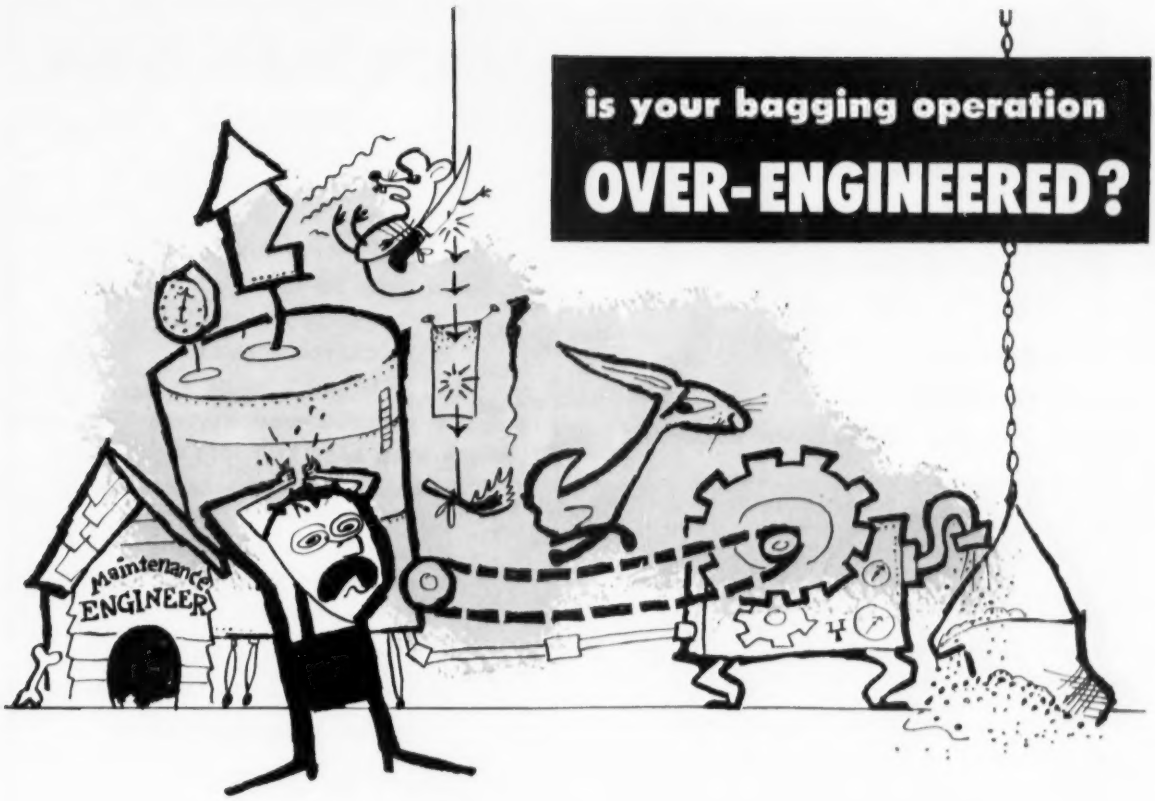
Correct information on how to use a fertilizer is really part of what you sell. The fertilizer alone—or the information alone—is of little use. . . . Fast talking might sell a farmer once, but if your product doesn't help him get those tons of hay, grain, fiber, root, or truck crops, he won't be your customer again. Under our system of free competition, he simply can't be a customer very long unless he, too, accomplishes his objectives. For the dealer, or the fertilizer industry, to prosper, **the farmer must make a profit on the fertilizer he buys.** Indeed, the right nutrients properly applied return to the farmer $2 to $3 on each $1 he normally invests in fertilizer.

Statistics indicate that 50 to 75 per cent of final decisions on what and how much fertilizer to buy are made at the sales counter or over the order book. Here is the golden moment for passing on the (right) information to the farmer. Everyone on the information team has to know the latest facts on any product and its use. Unless all of the people on this team are playing according to the same signals, we are not likely to enjoy very much success.

Time was when the Experiment Station worker, Extension Specialist, and the County Agent devoted their efforts entirely to farmer contact. A suspicion seemed to exist that the merchants and fieldmen were only out for the needed dollar and that they were often at cross purposes with an enlightened agricultural program. Farming is now big business. Farmers and experiment station workers have gotten out of their "overall" thinking and recognize that we are all part of a great team for increased agricultural production at higher efficiency for lower cost to the ultimate consumer. The farmer operates his business on the basis of facts and he wants those facts when and where it is most convenient for him to use them.

If this is the accepted philosophy, then how much time can the Experiment Station, the Extension Service, and County Agent's office devote to the fertilizer dealers and

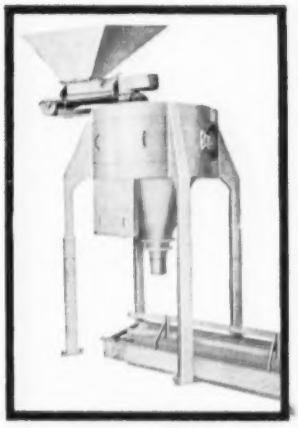
* *At Pacific Northwest Plant Food Association's Sun Valley Meeting, October 5.*



You need the new SOUTHLAND PACKER!

- **IT'S SIMPLE!** Just one scale system—*not two or three*—fewer moving parts, wearing points.
- **IT'S FAST!** Up to 30 50-lb. bags per minute, up to 25 80's and 100's—more than a single sewing machine can handle.
- **IT'S GUARANTEED ACCURATE!** Maintained weighing accuracy is guaranteed on 50-lb., 80-lb., 100-lb., and 200-lb. bags.
- **IT'S DURABLE, RUGGED!** Heavier, more rigid construction—generous use of stainless steel and non-corroding nylon bushings.
- **IT'S COMPLETELY ELECTRIC!** No troublesome air cylinders or hydraulic connections—needs no compressor.

The SOUTHLAND costs less, *saves more* . . . less spillage and dusting; minimum headroom and floor space; simple installation and maintenance. Enthusiastic users say it's "tops" in dependability.



All this, complete, less conveyor

only $2500

f.o.b. Chattanooga

DISTRIBUTED EXCLUSIVELY BY

CHASE BAG COMPANY

Packaging Specialists for over 100 years

CHASE BAG COMPANY

525 International Trade Mart, New Orleans 12, La.

Please send me free complete information on the new SOUTHLAND PACKER.

Individual _____

Company _____

Street _____

City, Zone, State _____

Arrives on Schedule

FUR-AG®

the sterilized organic conditioner

For years . . . First Choice of Leading Fertilizer Manufacturers

Fur-Ag is readily available . . . inexpensive, produced in volume, shipped to you on schedule 12 months a year. Among Fur-Ag's many advantages: reduces bag set, speeds up curing in the pile, provides bulk, sterilized—free from plant diseases, insects and weed seeds. Fur-Ag's dark, *natural color* helps make a rich-looking product. Write today for Bulletin 127.

The Quaker Oats Company

CHEMICALS DEPARTMENT

345 The Merchandise Mart, Chicago 54, Illinois

Alex. M. McIver & Son

BROKERS

Specializing

SULPHURIC ACID

SULPHUR

Ground Cotton Bur Ash, 38/42% K_2O Potash

HYNITE TANKAGE

CASTOR POMACE

TUNG POMACE

ORGANIC AMMONIATES

AMMONIATED BASE AND SUPERPHOSPHATE

ZEBRA DI-N-CAL—20.5% NITROGEN
(Ammonium Nitrate Limestone)

Representatives

Morgan Brothers Bag Company, Inc.

BAGS—PAPER AND TEXTILE

DOLOMITIC LIME
(42-44% Magnesium Carbonate)
(54-56% Calcium Carbonate)

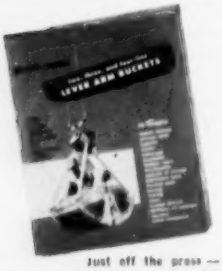
PEOPLES OFFICE BUILDING
Charleston South Carolina
Phones: 3-4828 and 3-4829

BLAW-KNOX

TIGHT-LIP BUCKETS . . .

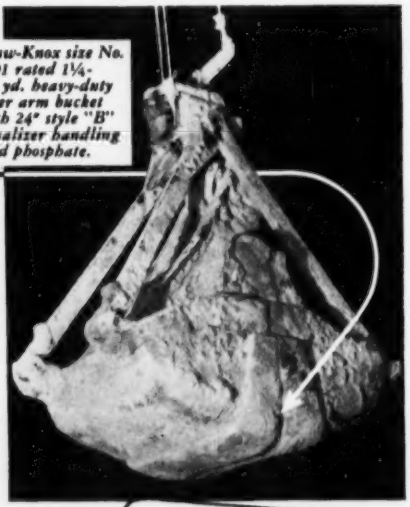
PREVENT CONTAMINATION *in your Material Handling Operations*

Blaw-Knox Chemical and Fertilizer Buckets are equipped with tight-fitting cast steel lips to prevent costly contamination caused by leakage of granular fines . . . one of the many features resulting from the worldwide experience of Blaw-Knox bucket engineers in the design and application of chemical and fertilizer buckets. This expert engineering service is available without obligation for analyzing your operating problems and requirements, and helping you select the proper size, weight and type bucket for peak performance.



Just off the press — a NEW Blaw-Knox Lever Arm Bucket Bulletin. Write for it. No. 2378B. Today.

Blaw-Knox size No. 0701 rated 1¼-cu. yd. heavy-duty lever arm bucket with 24" style "B" equalizer handling acid phosphate.



BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
PITTSBURGH 38, PA.
Offices in Principal Cities

BLAW-KNOX

BLAW-KNOX FERTILIZER BUCKETS

salesmen as the middle men, or center, of the education team? If we recognize dealers, fieldmen, and others of the industry as part of the team, it is easy to see that more time, effort, and hours should be spent to inform them of the signals and get them in on the plays. I am sure, in most cases, these persons recognize the obligation they carry in giving information to the farmer. In order to merit the farmers' trust as good informants, they must be sure the information they give to the farmer is the best available. The easiest way to do this is to get the information as it comes from the USDA and Experiment Station Research workers through the information channels of the Extension Service, the Soil Conservation Service, and other agencies.

Rather I have attempted here to show how vital is an educational program in putting soil science to work, getting the fertilizer where it will do the most good, and in showing how as a team the fertilizer industry and the land-grant institutions of the Pacific Northwest are organized to get the job done. . . . Armed with appreciation of what our teamwork in education has done, and encouraged by the tremendous potentialities for this type of program in the Pacific Northwest, the Association and the land-grant institutions will go forward with a bigger and better education-information-program, selling the right fertilizer and the right information for a strong, efficient and—we hope—a prosperous agriculture in the Pacific Northwest.

Du Pont Offers Booklet On Ammoniating Solutions

A new booklet on urea ammoniating solutions, including detailed unloading and handling instructions, has been issued by the Du Pont Polychemicals Department, manufacturer of "Uramon" ammonia liquors for the fertilizer industry.

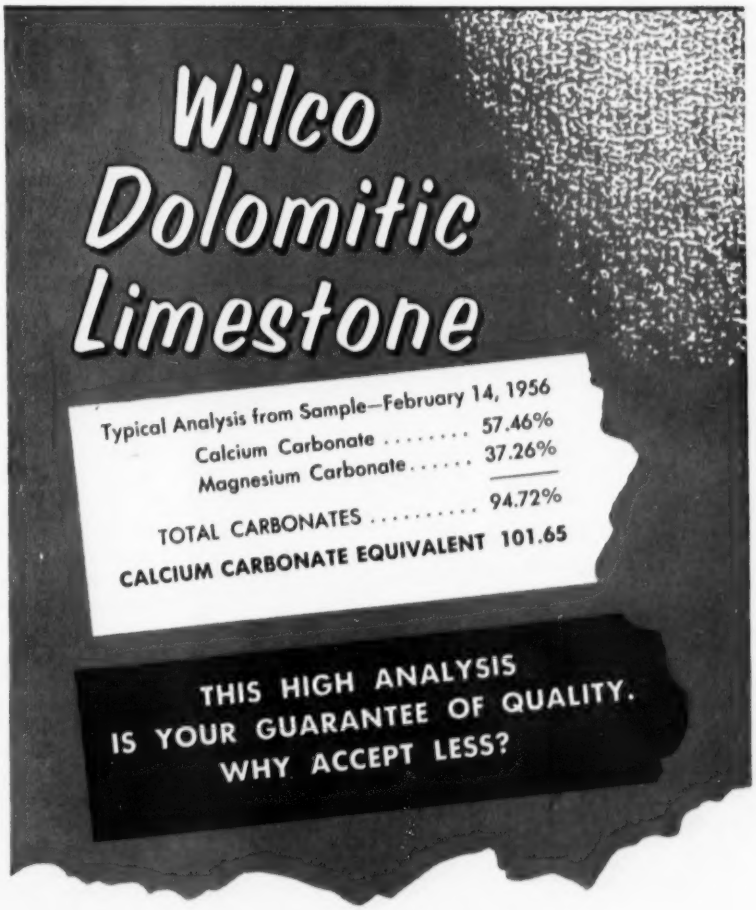
Tables offer complete information on the characteristics of Du Pont's urea ammoniating solutions. In addition, special graphs report the pound-per-square inch (p.s.i.) pressures generated by the ammoniating solutions at various temperatures, and the temperature rise produced when these solutions are added to fertilizer mixtures.

Unloading and handling instructions include schematic drawings of a tank car, and its various valves and connections.

Copies of the booklet on "Uramon" may be obtained by writing to Warren Lauder, Du Pont Polychemicals Department, Wilmington 98, Delaware.

THE BEST FERTILIZERS ARE MIXED FERTILIZERS
NITROGEN DIVISION, ALLIED CHEMICAL - SUPPLIERS OF NITROGEN TO THE FERTILIZER INDUSTRY

Selling customer's product to customer's customer: Here is an example of outdoor advertising for indirect selling, in a campaign prepared by Albert Sidney Noble, Advertising, for Nitrogen Division, Allied Chemical.


Wilco Dolomitic Limestone
Typical Analysis from Sample—February 14, 1956
Calcium Carbonate 57.46%
Magnesium Carbonate..... 37.26%
TOTAL CARBONATES 94.72%
CALCIUM CARBONATE EQUIVALENT 101.65
THIS HIGH ANALYSIS IS YOUR GUARANTEE OF QUALITY. WHY ACCEPT LESS?

WILLINGHAM-LITTLE STONE COMPANY

DOLOMITIC WILCO LIMESTONE

Fulton Federal Building

Atlanta 3, Georgia

Phone JAckson 3-5591

serving the south's fertilizer industry for more than 41 years

THE SIGN OF SERVICE

KENNEDY ASSOCIATES COMPANY

Engineers
Designers
Constructors

COMPLETE PLANTS

Engineered for best operation and minimum maintenance

GRANULATION
CONTINUOUS ACIDULATION
NITRIC PHOSPHATES
SULFURIC & NITRIC ACIDS
PHOSPHORUS
PHOSPHATE ROCK

SHIPPING UNITS
MIXING UNITS
STORAGE & HANDLING SYSTEMS

Davidson-Kennedy Associates Company
ATLANTA CHICAGO
P. O. Box 189
CHICAGO HEIGHTS, ILLINOIS

RESEARCH RESULTS & REPORTS

Texaco is justly proud of the fact that, for the first time in the history of its annual awards, the American Chemical Society has honored two from the same industrial research organization. The 1958 awards include the award in industrial and engineering chemistry to Texaco's duBois Eastman; the precision scientific award in petroleum chemistry to Robert P. Eischens of Texaco.

O

Britain has only half as much arable land as is needed to feed her population (barring, of course, miracle methods ahead) so she is logically enough looking to the medium with which she is surrounded, the Sea. Some British nutrition people believe that eventually they will get the bulk of their food from that source—and farming of sea crops is now actually under way. Where does the fertilizer industry come in on that? Perhaps some of us should be checking now.

O

California Fertilizer Association has arranged for California to really know beans. They have arranged with U of C to conduct an intensive fertilizer research program over a three year period on the various varieties of beans produced in the State. CFA is providing $9,000 for the purpose.

O

Out in Illinois a 1950 fertilizer demonstration is still showing the carryover value of plant food application. Seven years ago a strip of cucumber field was fertilized for maximum production. Now seeded to lespedeza, that strip is still producing 50% more hay per acre, despite the fact that during the intervening years the entire field has been given uniform plant food applications. The strip is even visibly better, because the lespedeza is greener, and weeds are fewer.

O

The Morrow Plots—where "practical lessons in soil management" have been demonstrated since 1876, are the subject of a very attractive folder put out by the University of Illinois. They make an interesting point: These plots are both a warning and a promise. That is, some of them have been allowed to become so depleted they grow only runts, while adjacent plots have been managed in the best known techniques.

Two plots have grown corn continuously since 1876, two have had a corn-oats rotation and so on. And for a long time rotation was the whole test subject. But in 1904 they began to inject the plant food question, testing variously.

You would find it interesting to see this report, which is beautifully printed, illustrated and written. The U of I College of Agriculture, Urbana, Illinois, probably has some spare copies. You might ask for one.

O

A new forage oat for South Georgia has been announced by University of Georgia's Coastal Plain station at Tifton. They call it AB-110 and it is hoped it will replace Southland oats, which have succumbed to crown rust and other diseases. You might like to write them for this report, too.

O

California's Riverside station has proved 99% effective a new control for root-rot fungi and citrus nematode. Sodium n-methyl dithio-carbamate kills 'em to a depth

of three feet, by the basin application method. They'll gladly tell you more.

O

Long and fine blond tresses, which look for all the world like woman's crowning glory, have been developed as a nuclear reactor fuel matrix of unique properties by Drs. Paul Harteck and Seymour Dondes, chemistry research scientists of Rensselaer Polytechnic Institute. The tresses are made of glass fiber into which has been incorporated the oxide of uranium-235.

The Rensselaer scientists developed the glass fiber fuel as an improvement in their recently announced method for fixing nitrogen from air. The nitrogen dioxide formed is highly valuable in making nitric acid, fertilizers, explosives and many other products.

O

Before a farmer invests in supplemental irrigation—a practice that can help greatly to increase crop yields—he should be willing and able to use high rates of fertilizer, the U.S. Department of Agriculture says.

Proper fertilization can markedly increase the water-use efficiency of crops. And since water supply often limits practical use of irrigation on farms, the possibility of stretching the available water by use of fertilizers is extremely important, USDA researchers point out.

Recent cooperative studies by USDA's Agricultural Research Service and the Alabama Agricultural Experiment Station on the response of crops to added moisture and fertility management reveal that:

1. There is a striking interaction of fertilizer and irrigation water. Until fertilizer was used, irrigation had no effect on the yield of Dallis, a promising summer forage grass in the South and Southeast. An application of 600 pounds of nitrogen per acre and high-level irrigation resulted in an increased yield of 6,000 pounds of dry forage per acre.
2. Unirrigated cotton showed no response to nitrogen application and the highest seed yield was only about 1,900 pounds. However, with high-level irrigation and application of 240 pounds of nitrogen per acre, the top yield was nearly 5,000 pounds. The tests showed that the nitrogen use per acre was increased when irrigation was applied.
3. Corn yields were unchanged regardless of the moisture supply when no nitrogen fertilizer was used. But when 120 pounds per acre of nitrogen was applied, along with adequate moisture, there was an increase in yield of 35 bushels per acre. Only about 40 pounds per acre of nitrogen was needed when moisture was low, but with increased moisture levels, requirements rose to as high as 120 pounds N per acre.

Although outstanding results can be obtained by increasing irrigation-nutrient levels, USDA cautions farmers that this sort of intense management can cause higher rates of soil acidity. Potassium is sometimes removed from the soil in large amounts when this type of farming is employed in producing grasses for hay.

SHUEY & COMPANY, INC.

Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for Florida Hard Rock Phosphate Export Association. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemist for National Cottonseed Products Association.

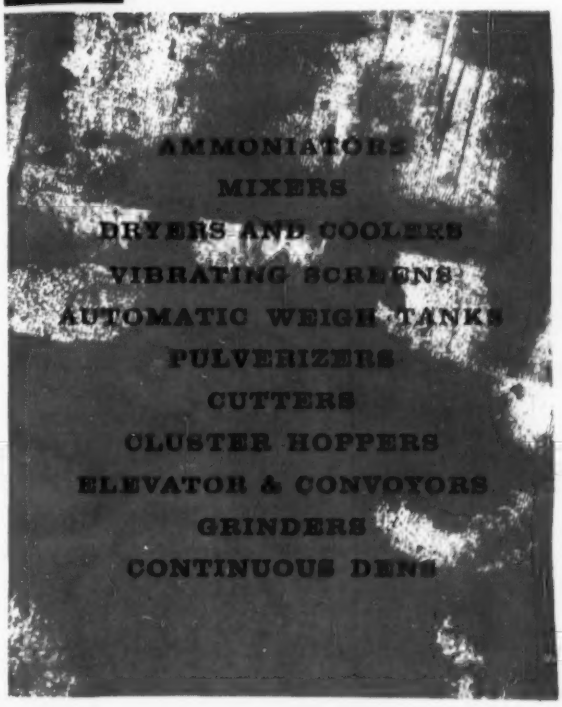
115 E. Bay Street, Savannah, Ga.

"THE SIGN OF QUALITY"

DAVIDSON-KENNEDY CO. D-K ATLANTA GA U.S.A.

EQUIPMENT MANUFACTURERS
PROCESSING EQUIPMENT

Nearly 70 years of manufacturing fine equipment



Davidson-Kennedy Company
ATLANTA CHICAGO
P. O. Box 97, Station "D"
ATLANTA, GEORGIA

CALL ARMOUR

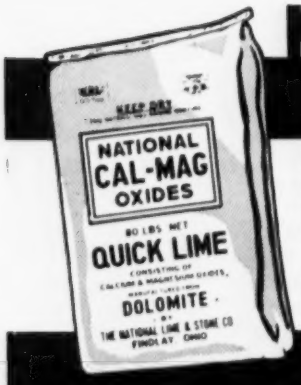
greatest name in fertilizers

READY TO
SERVE YOU WITH
31 factories
and offices

PHOSPHATE ROCK • TRIPLE SUPERPHOSPHATE
SUPERPHOSPHATE • SHEEP MANURE

ARMOUR FERTILIZER WORKS

GENERAL OFFICE, P.O. BOX 1685, ATLANTA 1, GEORGIA



NATIONAL CAL-MAG OXIDES

NOW IN TWO SCREEN SIZES

MgO 40.39 – CaO 58.07 – TNP 203.88
Superior for Dehydrating, Neutralizing, and Curing factors in the preparation of effective fertilizers.

PROMPT SHIPMENTS
Three railroads serve our Carey, Ohio, plant — assuring prompt delivery — everywhere.

WRITE FOR COMPLETE INFORMATION TODAY! Dept. CF

We Also Produce
DOLOMITIC HYDRATED LIME (165 TNP)
and
KILN DRIED RAW DOLOMITE (107 TNP)
Screened to size

The NATIONAL LIME and STONE CO.
General Offices • • • • • FINDLAY, OHIO

Complete **GRANULATION UNITS** Turn-Key

Practical and Economical

SUPERPHOSPHATE PLANTS

TYLER CHAIN MILLS ELEVATORS ELEVATOR BUCKET CLEANERS

COMPLETE ENGINEERING SERVICE

Write Us Today About All Your Equipment Requirements

LONGHORN CONSTRUCTION CO.

P. O. BOX 336 SULPHUR SPRINGS, TEXAS TEL. TUX 5-2214—TUX 5-3124

MARKETS

ORGANICS: Organic ammoniates continue in stable position with most producers of nitrogenous tankage shipping against contract commitments. Prices range from $3.00 to $4.00 per unit of ammonia, October through December and $3.12½ to $4.25 January/forward, depending on production point.

SEWAGE SLUDGE: Current price of one major producer effective October 1st is $3.10 per unit of ammonia and 50¢ per unit APA bulk f.o.b. Midwest production point. Another producer in the Southwest is quoted at $2.75 per unit of nitrogen and 50¢ per unit of APA bulk.

CASTOR POMACE: Supply continues limited for October through December shipment at $45.50 per ton in bags f.o.b. Eastern Seaboard production point.

DRIED BLOOD: Unground, sacked blood is indicated at $5.75 to $6.00 per unit of ammonia in the Chicago area and in the New York area it is indicated at around $5.00.

POTASH: No changes in scheduled contract prices are reported and demand is seasonal.

GROUND COTTON BUR ASH: Supplies continue adequate and demand is steady.

INDUSTRY CALENDAR

Date	Organization	Place	City
Nov. 3-5	Calif. Fert. Assn.	St. Francis Hotel	San Francisco
Nov. 6-8	Fert. Indus. Round Table	Sheraton Park	Washington, D.C.
Nov. 17-19	Nat'l Fert. Solutions Assn.	Netherland-Hilton	Cincinnati, Ohio
Nov. 18-22	Amer. Soc. Agronomy	Atlanta Biltmore	Atlanta, Ga.
Nov. 25	Okla. Fert. Dealers	Okla. State U.	Stillwater
Nov. 26	Okla. Soils, Crops Conf.	Okla. State U.	Stillwater
Dec. 3	Fert. Mfgs. Conf.	Iowa State U.	Ames
Dec. 4	Dealers Short Course	Iowa State U.	Ames
Dec. 11-13	Ag. Ammonia Inst.	Marion Hotel	Little Rock, Ark.
	1958		
Jan. 7-8	Texas Fert. Conf.	Memorial Center	College Station
Feb. 13-14	MidWest Soil Impr.	Edgewater Beach	Chicago, Ill.
June 9-11	Sou. Control Officials	Heart'Atlanta Motel	Atlanta, Ga.
July 16-19	S.W. Fert. Conf.	Buccaneer Hotel	Galveston, Texas

SUPERPHOSPHATE: Superphosphate demand for normal and triple superphosphate is in seasonal dimensions with prices steady.

PHOSPHATE ROCK: During the first week of October the cost of labor advanced 4¢ resulting in an advance for phosphate rock of about 12¢ per long ton for spot material. Supply continues comfortable and movement steady.

CALCIUM AMMONIUM NITRATE: Demand is in low seasonal volume and prices are $1.75 per ton higher than during the previous season. Present price is $49.75 per ton in bags f.o.b. Eastern Seaboard production point, and f.o.b. cars Atlantic and Gulf Ports.

AMMONIUM NITRATE: Prices continue as announced October 1st at $68.00 per ton in bags f.o.b. shipping point. The demand is in low seasonal volume at this time.

GENERAL: Fertilizer manufacturers continue to build up stocks of materials in anticipation of the late fall and spring demand for mixed fertilizers. In some areas the fall season just beginning has been disappointing to fertilizer manufacturers from the standpoint of volume of sales. Weather conditions cause delay in movement in some areas, principally the Southeast, where rainfall has been frequent.

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	September 1957	September 1956	August 1957	August 1956	July 1957	July 1956	January-June 1957	January-June 1956	July-December 1956	July-December 1955	YEAR (July-June) 1956-57	YEAR (July-June) 1955-56
Alabama	.....	35,418[1]	20,826	21,546	17,153	16,468	808,900	872,550	174,707	165,867	983,607	1,042,416
Arkansas	.....	13,652[1]	9,120	7,635	20,457	11,869	265,265	299,172	59,915	60,299	325,150	359,471
Georgia	18,128	18,884	21,814	19,487	60,490	46,437	980,824	988,454	253.559	250 968	1,234,383	1,244,422
Kentucky	.....	20,641[1]	.....	12,294[1]	.....	5,336[1]	451,083	441,481	90,284	91,478	541,367	529,600
Louisiana	10,638	10,324	9,676	5,974	11,459	7,852	200,277	217,343	71,129	59,345	271,406	273,688
Missouri	.....	93,613[1]	53,079	56,557	26,013	26,842	460,487	444,230	331,343	356,241	791,830	800,471
N. Carolina	.....	31,272[1]	25,013	21,024	12,999	14,968	1,300,353	1,324,267	216,234	225,182	1,516,587	1,649,449
Oklahoma	20,489	11,824	4,992	9,946	4,351	3,396	52,836	65,854	54,509	69,542	107,345	135,396
S. Carolina	23,822	18,344	13,416	11,911	11,248	12,764	694,571	743,670	122,929	119,947	817,500	863,617
Tennessee	.....	21,110[1]	16,229	12,559	18,506	24,536	383 457	378,626	165,796	154.260	549,253	532,886
Texas	42,746	32,779	22,333	14,458	44,039	24,199	392,770	372,695	202,406	193,704	595,176	566,399
California	(reports compiled quarterly)						663,484	639,377	412,747	361,615	1,079,748	1,001,554
Virginia	(reports compiled quarterly)						600,158	599,111	154 075	162.709	754,223	761 820
Indiana	(reports compiled semi-annually)						781,268	807,981	305,917	255,131	1,087,185	1,063,049
Iowa	(reports compiled semi-annually)						.....	315,329[1]	85,147	130,000	.....	445,329[1]
Michigan	(reports compiled semi-annually)						.....	443,908[1]	184,763[1]	*	.....	*
New Hampshire	(reports compiled semi-annually)						15,730	13,168	3,253[1]	*	18,983[1]	*
Washington	(reports compiled semi-annually)						.....	103,885[1]	55,709	48,749	.....	152,674[1]
Connecticut	(report issued annually)										.....	76,660[1]
Oregon	(report issued annually)								62,147[1]	*	.....	*
TOTAL	113,823	92,155	196,498	181,097	226,715	189,331	8,051,463	8,207,979	2,756,406	2,705,037	10,654,760	10,824,238

.....(not yet reported) * Not compiled [1] Omitted from column total to allow comparison with some period of current year.

ASHCRAFT-WILKINSON CO.

Fertilizer Materials — *Oil Seed Meals*

Home Office: ATLANTA, GA.
Cable Address
ASHCRAFT

Offices: NORFOLK, VA., CHARLESTON, S. C., TAMPA, FLA.
JACKSON, MISS., COLUMBUS, OHIO, MONTGOMERY, ALA.
DES MOINES, IOWA

Exclusive Distributors: DUVAL SULPHUR & POTASH COMPANY
and ESCAMBIA CHEMICAL CORPORATION

AMMONIATES — FEED STUFFS — SULPHUR — POTASH
INDUSTRIAL AND AGRICULTURAL
CHEMICALS

Specialists in

MAGNESIA FOR AGRICULTURE

EMJEO (80/82% Magnesium Sulphate)
Calcined Brucite (fertilizer grade) 65% MgO

POTNIT
(95% Nitrate of Potash) for Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

Insecticides
Fungicides

EXPORT
•
IMPORT

Berkshire Chemicals
INC.
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.
BOSTON • CHICAGO • CLEVELAND • PHILADELPHIA • SAN FRANCISCO

Lancaster, Allwine & Rommel
Registered Patent Attorneys
Suite 482
815—15th STREET, N. W.
Washington 5, D.C.

Patent Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions.

Booklet and form "Evidence of Conception" forwarded upon request.

Cut Production Costs—

Speed up your plant with
ATLANTA UTILITY FERTILIZER MACHINERY

Fertilizer Mixing Systems	Elevators
Revolving Screens	Fertilizer Shakers
Mixing Plows	Cage Mills
Clod Breakers	Batch Mixers

Write Today for Descriptive Folder

ATLANTA UTILITY WORKS
EAST POINT, GA.

Richardson Introduces Inexpensive Gross Bagger

A belt-fed gross bagger with completely automatic cut-off has been announced by Richardson Scale Company. The new unit, called Model GA-17, which requires headroom of only 3'-11", is claimed to provide accurate high speed bagging at the fundamentally low cost of a gross weigher.

Designed for use with open mouth textile and multi-wall paper bags, in sizes from 10 lb. to 140 lb. capacity, the GA-17 rapidly feeds the material from overhead supply bin directly into the empty bag, so that a speed of up to six or more bags per minute can easily be achieved. The unit bags a variety of materials.

Incorporation of the belt feeder permits the handling of an extended range of materials by a gross weigher. The feeder, in combination with the new style trigger device that automatically stops the feeder and cuts off the scale when the desired weight is reached, contributes substantially to the accuracy. Material is delivered to the bag in an even, regular stream, the depth of which is controlled by an adjustable regulating gate. This machine is available in mild steel, or 100% stainless platework wherever material makes contact, for abrasive or corrosive material.

In operation, the bag is slipped on the bag spout and held in position by a Cam Grip Bagholder. The operator then pulls the gate handle, which opens the radial gate and starts the belt feeder. The weighing operation then proceeds automatically. When the beam comes to balance, the belt feeder stops and the gate cut-off closes.

For additional information, write to Richardson Scale Co., Van Houten Ave., Clifton, N. J.

Dorr-Oliver Expanding Worldwide

Realignment of organization aimed at expanded activity in project work was announced by Dorr-Oliver October 1. While the organizational changes involve only the staff of the parent company, the practical results are expected to affect materially the company's ability to cover and service the engineering markets of the world more effectively through its overseas network of subsidiaries and representatives.

In the chemical field, one of Dorr-Oliver's major areas has been the design and supply of chemical fertilizer plants. Since entering the field approximately 35 years ago the company has designed and put into operation some 50 phosphoric acid or granular fertilizer plants, the largest of these being the two recent 200,000 ton per year triple superphosphate Florida installations of Davison Chemical and American Cyanamid. Geographically the spread of recent fertilizer, alumina and magnesia installations is impressive, including such diverse locations as England, Scotland, Norway, Greece, Germany. France, South America, Tasmania, India and Japan.

William C. Weber, who will head up Dorr-Oliver's chemical project work as manager of Chemical Project Sales, has had both project and process development and broad plant design and operating experience since joining the company in 1918. He has been in charge of the company's work in phosphoric acid and chemical fertilizers and has been responsible for many important technological advances in this field, holding numerous equipment and process patents which are in wide current use.

'Geared Flexible Couplings' Is New Link-Belt Book

A new book describing Link-Belt Company's complete line of improved geared flexible couplings has just been released.

Book 2775, a completely new 12-page publication, details pertinent application and selection data for couplings with maximum bores ranging up to seven inches and ratings from 2½ to 572 horsepower per 100 r.p.m.

For your copy of Book No. 2775, "Geared Flexible Couplings," write to Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill.

General Metals Offers New Condensed Catalogue On Liquid Fertilizer Equipment

General Metals, Inc., of Greensboro, N. C., has just published a new condensed catalogue on their line of equipment for nitrogen solutions and complete liquid fertilizers. General Metals makes a complete line all the way from storage tanks to field applicators. The condensed catalogue pictures and gives a brief description of nearly all items in the General Metals line.

Tanks of aluminum, steel and stainless steel are made to ASME specifications in sizes ranging from 30 to 22,000 gallons, both pressure and non-pressure types.

The condensed catalogue shows General Metals line of two-wheel trailer applicators complete with trailer, tank, booms and pump, offering a metering pump with "dial the rate of application".

Tractor applicators of all the various types described consist of tanks, mounting brackets, boom, brackets, pump and drive unit. Information is given on a new, 3-point hitch applicator with 100 gallon tank, that can be equipped with plow tubes for sub-surface application or row crops and a boom for pasture or small grain application.

Three types of "nurse tank" transports are described, regularly equipped with 1000 gallon tanks, but other sizes are available, with choice of air compressor or pump for these units. Described are: tandem wheel transport; four-wheel wagon; and truck transport.

Copies of the new condensed catalogue are offered free to the public. Write Charles G. Monnett, sales manager, General Metals, Inc., Box 448, Greensboro, N. C., and ask for condensed catalogue number 26.

Two Oklahoma Meetings

The Oklahoma Fertilizer Dealers' Conference is scheduled for Monday, November 25. The Oklahoma Soils and Crops Conference follows on Tuesday, November 26. Both will be held at Oklahoma State University, Stillwater.

SOUTHERN STATES PHOSPHATE and FERTILIZER CO.
SAVANNAH, GEORGIA
Manufacturers of SULPHURIC ACID, SUPERPHOSPHATE, COMPLETE FERTILIZERS and ALL TYPES OF BASE GOODS
EXPORT ORDERS SOLICITED

Members of National Plant Food Institute Traffic Committee at Carlsbad meeting: Seated (l to r): J. L. Tompkins, Virginia-Carolina Chemical Corp.; R. O. Erickson, Anaconda Co.; Turner W. Blagg, U. S. Industrial Chemicals Co.; John S. Carlson, Stauffer Chemical Co.; Eugene Landis, International Minerals & Chemical Corp.; Paul T. Truitt, executive vice president, National Plant Food Institute; Walter D. Matson, of NPFI general counsel, Cummings, Sellers, Reeves and Conner; Philip Janicola, United States Potash Co.; John H. Wright, Ashcraft-Wilkinson Co. **Standing** (l to r): Norman F. Cheney, American Potash & Chemical Corp.; Lee Culbreth, Commercial Solvents Corp.; Bill Adams, Shell Chemical Corp.; Durward L. Brooks, Escambia Chemical Corp.; Blair Love, Consolidated Mining & Smelting Co. of Canada, Ltd.; Ellwood B. Luke, Western Phosphates, Inc.; Ronnie Ellwing, International Minerals & Chemical Corp.; Vernon Hansen, Southern States Cooperative; Howard McGalin, Olin Mathieson Chemical Corp.; I. C. Dickerson, Phillips Petroleum Co.; W. E. Maley, U. S. Borax & Chemical Corp.; Wilton Barger, Spencer Chemical Co.; Lloyd Robinson, International Minerals & Chemical Corp.; Zachary Taylor, Potash Co. of America; Jack McBride, National Potash Co.; Ralph Littrell, National Potash Co.

Triangle Brand Copper Sulphate has been recognized as an effective agricultural chemical for more than sixty years. In sprays (where Bordeaux mixtures are the most reliable), **in dusts (if you prefer them)** and in fertilizers (for additional enrichment of the soil) Triangle Brand Copper Sulphate has proved itself worthy and dependable. Try these Triangle Brand forms of Copper Sulphates:

INSTANT (powder) for quick and efficient mixing or Bordeaux sprays.

SUPERFINE (snow), SMALL or LARGE CRYSTALS, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

Write for booklets that will help you solve your agricultural problems.

Control POND SCUM and ALGAE with Triangle Brand Copper Sulphate. Write today for information on how it can help you maintain healthy water conditions.

PHELPS DODGE REFINING CORP.
300 PARK AVE. NEW YORK 22, N.Y. • 5310 W. 66th STREET, CHICAGO 38, ILL.

NPFI Traffic Committee Offers Aid To Railroads

In the interest of avoiding further rail freight rate increases, National Plant Food Institute is offering "such assistance as it may appropriately give before regulatory commissions or otherwise, in helping the railroads to reduce unit operating costs."

This action is the result of a resolution passed by the Institute's Traffic Committee during its recent meeting in Carlsbad, N. M. The Committee also commended the Southern carriers "for their realistic forbearance" in the application of rate increases permitted by the Interstate Commerce Commission under Ex Parte 206, and urged railroad managements in other territories to follow the lead of the Southern carriers by applying the rate increases "on a realistic basis."

In passing the resolution, the group took recognition of the problems of increasing costs faced by the railroads, but deplored the effect of increasing freight rates in diverting fertilizer tonnage from the railroads to competing forms of transportation including private carriers.

The resolution offers to help the railroads achieve reduced unit operating costs by: "(a) pursuing a more vigorous policy toward the abandonment of unprofitable passenger train services; (b) the substitution of trucking in lieu of rail services where operating economies may be achieved; and (c) the consolidation, where feasible, of duplicate services."

Iowa Meetings Slated

Iowa's Fertilizer Conference for Manufacturers will be held December 3, and the Short Course for Dealers will be December 4. Both will be at Iowa State College, Ames.

J. A. Stritzel, chairman of the short course committee, suggests early attention to hotel accommodations. A list of hotels and motels at Ames is available, and can be obtained by writing to him at the Extension Service office of the college.

LAW & COMPANY
Founded 1903
FERTILIZER CHEMISTS
Three Convenient Laboratories
P. O. Box 1558 Atlanta 1, Ga. | P. O. Box 789 Montgomery, Ala. | P. O. Box 629 Wilmington, N. C.

Wiley & Company, Inc.
Analytical and Consulting Chemists
Calvert & Read Streets
BALTIMORE 2, MD.

PROMISING EXPORT BUSINESS

SPECIALIZED FERTILIZER AGENCY IN COLOMBIA, SOUTH AMERICA wishes to represent on exclusive basis export-minded manufacturers of Triple Superphosphate 46%, Ammonium Phosphate, Urea, complete fertilizers, agricultural chemicals, etc.—

Excellent connections with official agencies and private concerns. First class professional and commercial references will be furnished. Please write to Apartado Aereo No. 4243, Bogota., Colombia, S. A.

Serving the
FERTILIZER INDUSTRY
Fertilizer Equipment Sales Corp.
Designers — Engineers — Manufacturers of Fertilizer Machinery
Sales and engineering office: P. O. Box 1968, 130 Krog St., N. E. Atlanta, Ga. Phone JAckson 3-6615
Manufacturing plant: P. O. Box 67, 1641 Poland St. New Orleans, La. Phone Bywater 8373

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

SITUATION WANTED

Man, mature, broad administrative experience: sales, order, traffic, accounting, fertilizer and raw materials. Willing to relocate. Box 29, c/o Commercial Fertilizer, 75 Third St., N.W., Atlanta 8, Ga.

PLANT FOR SALE

FOR SALE: Fertilizer equipment and tornado damaged fertilizer plant at Fargo, N. D. Building has vertical columns, foundation, bin cribbing, warehouse dock. Equipment consists of drying, cooling and pelletizing drums, fans, dust collectors, Stedman mixer, I and C. bagger, hopper system and scales, flowrators, bucket elevators. Keystone 150 hp boiler, two Tyler screens, one Link Belt vibrating screen, two payloaders, Yale fork lift and pallets. Acid and fuel oil tanks, several miscellaneous conveyors, 50 totally enclosed motors up to 40 hp. Contact Ted B. Schultz, Asst. General Manager, Peavey Elevators, 809 Grain Exchange, Minneapolis 15, Minn.

EQUIPMENT FOR SALE

FOR SALE: One used, One (1) ton, Worthington Mixer Complete with base and discharge chute. Marion Plant Life Fertilizer Co., Marion, Ohio.

LIQUIDATING PLANT—Have following machinery to sell: Model 12-B Michigan loader; Clark 50 fork lift; 2 "HA" Hough Payloaders; 2 Clark dumps; Schmutz two color printing press; portable Worthington air compressor; stationary Ingersoll air compressor; rock crusher; 2 complete 1-ton mixing units with bucket elevator, screen, valve packing unit, also burlap bag sewing unit; 2 Stedman hammer mills 24 x 20 with 100 h.p. motor; 2 bag piling conveyors; 22,000 lb. 8' x 10' Fairbanks platform scale; Fairbanks Printomatic 10' x 20' 20-ton platform scale; 4 bulk moving conveyors; unloading elevator — frame 24" high, 29" wide; Elevator for series of small hoppers; 3 2400-lb. 3 x 4 platform scales; Stedman hopper system; and other related equipment. Contact Olds & Whipple, Inc., Hartford, Conn. Phone JAckson 2-9121.

NEW EQUIPMENT AT FACTORY PRICES. NEW CONVEYOR BELTING FROM HUGE, FRESH STOCK. Vibrating screens from $443.00. Crushers from $527.00. Feeders from $275.00. All types of bucket elevators and belt conveyors. Steel troughing idlers and return rolls. Conveyor parts, accessories, and drives. All machines built in the Bonded factory. Buy your factory-fresh conveyor and elevator belting from one of the largest stocks in United States, Canada and Mexico. 4-ply, 28 oz. duck, $\frac{1}{8}$" x $\frac{1}{32}$" rubber covers: 14", $2.83 ft.; 16", $2.97 ft.; 18", $3.29 ft.; 20", $3.80 ft.; 24", $4.26 ft.; 30", $.5.21 ft.; 36", $6.18 ft. Many other widths, plies, and specifications in our fresh stock. FREE CATALOGUE AND PRICES: more than 200 models of Bonded machines for chemical, fertilizer, mining, quarrying, aggregate and clay industries. BELTING SAMPLES FREE. Bonded Scale Co., 42 Bellevue, Columbus, Ohio. Phone days HI. 4-2186; Evenings AX. 1-2213.

FOR SALE: Baird Dryers 4 x 30'; Heil Dryers 8 x 24. Dewatering Presses, Louisville 8 Roll 36"; Davenport #1A, #2A; Ribbon Mixers 336 cu. ft. Gemco 6' dia. Conical Blender; Rotary Steam Tube Dryers 6' x 45', 4' x 30'. Steel & Aluminum Tanks 400 to 23,000 gal. Also pulverizers, Conveyor, etc. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

FOR SALE: Rotary Dryers 5' x 30', 5' x 40', 4'6" x 50', 5' x 67', 6' x 60', 9' x 80'. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

STEDMAN

S

FERTILIZER PLANT EQUIPMENT

Established in 1834

ALL STEEL SELF CONTAINED
FERTILIZER MIXING AND BAGGING
UNITS

COMPLETE GRANULATING PLANTS

Batch Mixers—
Dry Batching—
Pan Mixers—
Wet Mixing

Dust Weigh Hoppers
Vibrating Screens
Acid Weigh Scales

Tailings Pulverizers—Swing Hammer and Cage Type

Belt Conveyors—Stationary and Shuttle Types

Batching Systems
Bucket Elevators
Hoppers and Chutes

STEDMAN FOUNDRY & MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
General Office & Works: AURORA, INDIANA

INDEX TO ADVERTISERS

Abbe Engineering Co., Inc., Kent Mill Div.
Allied Chemical & Dye Corp.,
Nitrogen Div. ..... Front Cover, 19-22
American Agricultural Chemical Company, The
American Cyanamid Co., Phosphates Department 11
American Limestone Co.
American Potash & Chemical Corporation
Armour Fertilizer Works 72
Ashcraft-Wilkinson Co. 26, 74
Atlanta Utility Works 74

B.I.F. Industries, Inc., Omega Machine Co. Div. 55
Bagpak Division, International Paper Co.
Bemis Bro. Bag Co.
Berkshire Chemicals, Inc. 74
Blaw-Knox Company, Blaw-Knox Equipment Division 68
Blaw-Knox Company, Chemical Plants Division
Blue Valley Equipment Mfg. & Engineering Co. 15
Bonneville, Ltd.
Bradley & Baker
Burlap Council of Indian Jute Mills Assn.

Chase Bag Company 67
Cole Manufacturing Co., R. D.
Commercial Solvents Corporation 17
Compania Colombiana De Inversiones Agricolas, Ltda. 77
Continental Gin Co., Industrial Div. 18

Davidson-Kennedy Associates Co. 70
Davidson-Kennedy Co. 71
Davison Chemical Co., Div. W. R. Grace & Co. 38
Dow Chemical Company, The
du Pont De Nemours & Co. (Inc.), E. I. 56
Duval Sulphur and Potash Co. 26

Emulsol Chemical Sales Corporation

Fertilizer Equipment Sales Corporation 77
Fulton Bag & Cotton Mills 13

Grand River Chemical Division, Deere & Company

Hayes & Stoltz Industrial Mfg. Co., Inc.
Hough Company, The Frank G.

International Minerals & Chemical Corporation
Phosphate Chemicals Division 6-7
Phosphate Minerals Division 27
Potash Division 9
International Paper Company

Kraft Bag Corporation ..... Inside Front Cover

Lancaster, Allwine & Rommel 74
Law & Company 77
Longhorn Construction Co. 72
Lummus Company, The 8

Marietta Concrete Corporation, The
McIver & Son, Alex M. 68

National Lime and Stone Co., The 72
National Potash Company 47
Nitroform Agricultural Chemicals, Inc. 65
Nordberg Manufacturing Company

Omega Machine Company, Div. B.I.F. Industries, Inc. 55

Phelps Dodge Refining Corporation 76
Phillips Chemical Company
Potash Company of America ..... Inside Back Cover

Quaker Oats Company, The (Chemicals Dept.) 68

Raymond Bag Corporation 10
Renneburg & Sons Co., Edw.
Richardson Scale Company 52

Sackett and Sons Co., The A. J. 40, 41
St. Regis Paper Company, Multiwall Bag Division
Shuey & Co., Inc. 71
Simplicity Engineering Company
Sinclair Chemicals, Inc.
Smith-Rowland Company 3
Sohio Chemical Company 14
Southern Nitrogen Company, Inc. 30, 31
Southern States Phosphate and Fertilizer Co. 75
Southwest Potash Corporation 23
Spencer Chemical Company 48, 49
Stedman Foundry & Machine Company, Inc. 78

Tennessee Corporation
Texas Company, The Petrochemical Sales Division
Texas Gulf Sulphur Co.
Tull Metal & Supply Co., Inc., J. M. 12

Union Bag-Camp Paper Corporation 16
Union Special Machine Co. ..... Back Cover
U. S. Industrial Chemicals Co., Division of National Distillers & Chemical Corporation 63
U. S. Phosphoric Products Division, Tennessee Corp. 42
United States Potash Company,
Div. United States Borax & Chemical Corp. 35
United States Steel Corporation 61

Weatherly Company, The D. M. 4
Wiley & Company, Inc. 77
Willingham-Little Stone Company 69
Woodward & Dickerson, Inc.

GIANT SERVANT OF AGRICULTURE

Use The Best!

One source to supply your
present day Potash requirements.

New 60% Standard Muriate

New 60% Special Granular Muriate

New 60% Coarse Granular Muriate

Sulphate of Potash

Chemical Muriate - 99.9% KCl Minimum

Quick Service - High Quality
Phone, write, telex, or wire us.
Phone STerling 3-4990, Washington
TWX No. - WA-331

POTASH COMPANY OF AMERICA
CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

HEAVY DUTY BAG CLOSING

UNION SPECIAL builds sewing heads and auxiliary equipment for closing all types and sizes of filled bags. These sewing heads set the standard the world over for speed, economy, and dependability — wherever the product is bagged. They stand up longer in all kinds of service and under the most severe working conditions. They are capable of high production day-in and day-out. For detailed information, ask for a copy of Bulletin No. 200. See our nearest representative or write today.

Union Special MACHINE COMPANY
412 North Franklin St.
Chicago 10, Ill.

— calls for

Union Special® equipment!

● SEND FOR BULLETIN No. 200

STYLE 20500 B

This heavy duty unit is designed for closing 100 lb. textile or multiwall paper bags at rates up to 3,840 bags per 8 hr. day. Gear driven horizontal and inclined conveyor. Counterbalanced sewing head easily adjustable for height of bag. Sewing speed synchronized with conveyor speed. Choice of controls.